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TRANSACTIONS

OF THE

ANTHROPOLOGICAL SOCIETY

OF WASHINGTON.

PUBLISHED WITH THE CO-OPERATION OF THE SMITHSONIAN INSTITUTION.

VOLUME II.

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INTRODUCTORY STATEMENT.

The Anthropological Society of Washington was organized February 17, 1879, by the adoption of a constitution substantially the same as that now in force. Its object, as stated in Article II, is to encourage the study of the Natural History of Man, especially with reference to America, including Somatology, Philology, Philosophy, Psychology and Technology. Its members are of three classes, Active, Corresponding, and Honorary, all of whom are elected by the Council on nomination in writing by two active members of the Society. Active members pay an initiation fee of five dollars, which covers the annual dues for the first year; afterwards the annual dues are three dollars. Regular meetings are held in the Library of the Army Medical Museum on the first and the third Tuesday of each month from November to May inclusive, in which papers are read by members of the Society, or others who may be invited by the Council, and topics discussed relating to the various branches of Anthropological science.

The publications of the Society prior to the present volume consist of a volume of one hundred and fifty pages, entitled "Abstract of Transactions," which covers the period from the organization to January 18, 1881. Subsequently, the Smithsonian Institution having agreed to coöperate in the publication, a pamphlet of one hundred and forty-two pages was issued as Volume I of Transactions of the Anthropological Society of Washington, embracing the work of the Society to and including the meeting of January 17, 1882.

The Council have believed it more satisfactory, as it is more convenient, to have succeeding volumes contain the proceedings of each winter's season, and therefore the present issue comes down to May 15, the closing meeting of the season of 1882–83. If this plan be continued, the next volume will cover the period from Novem-

ber, 1883, to May, 1884. Most of the papers contained in these volumes have been published separately by the Smithsonian Institution, in scientific magazines, or by their authors in pamphlet form.

The Society has been recognized by the Treasury Department as entitled to import books for its collection free of duty, and many valuable gifts from European authors have been received, as the lists in the present volume testify.

Owing to the illness of the retiring President, his annual address was not completed in time for delivery at any of the meetings of the season of 1882-'83. It was therefore reserved for the opening meeting (November 6, 1883,) of the next year, but appears in its proper place at the close of this volume.

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OF THE

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Corrected to October 10, 1883.

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(Corrected to November 20, 1883.)

The following list aims principally to facilitate correspondence with the active members of the Society. It therefore gives the post-office address of each member, and the particular form and style in which he prefers to be addressed, adding in some cases his particular profession or pursuit. So few members known to have university degrees having expressed a desire to have them printed in the list of members, and some having objected to this being done, it was thought best to omit them in all cases. Washington, D. C., is understood unless otherwise specified. Members are particularly requested to advise the Secretary to the Council of any change of address.

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Mr. George Kennan, Journalist, Lock box 23.
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TRANSACTIONS.

Fiftieth Regular and Fourth Annual Meeting, January 17, 1882.

Major J. W. Powell, President, in the Chair.

The Chair laid before the Society the following proposed amendments to the Constitution which the Council had considered and approved:

1. To refer the election of members to the Council.

2. To increase the entrance fee from two to five dollars, and the annual dues from two to three dollars.

3. To change the classification of Anthropology from that defined in Article II of the present Constitution to the following subdivisions: 1, Somatology; 2, Sociology; 3, Philology; 4, Philosophy; 5, Psychology; and, 6, Technology.

4. To change the designation and duties of the two Secretaries, so that there shall be a General Secretary and a Secretary to the Council, the former to have charge of the transactions of the Society, and the latter of the business of the Council.

5. To require each of the Vice-Presidents to deliver an address annually on some subject belonging to his division of anthropology, and to exempt the President from confining his annual address to the work of the Society during the preceding year.

6. To make the time of holding meetings extend from November to May, inclusive, instead of from October to June.

The Society then proceeded to consider the several propositions in the order stated, and they were separately voted upon and adopted without modification.

The annual reports of the Treasurer and the Curator were then respectively presented and received.

The Society next proceeded to the election of officers for the ensuing year.

The following are the officers elected:

PRESIDENT	J. W. POWELL.
VICE-PRESIDENTS	ROBERT FLETCHER. J. C. WELLING. GARRICK MALLERY. O. T. MASON.
GENERAL SECRETARY	LESTER F. WARD.
SECRETARY TO THE COUNCIL	F. A. SEELY.
TREASURER	J. HOWARD GORE.
CURATOR	W. J. HOFFMAN.
COUNCIL AT LARGE	E. A. FAY. MILES ROCK. A. F. A. KING. G. K. GILBERT. S. M. BURNETT. H. W. HENSHAW.

Upon the announcement of the result, the Society at 9.30 adjourned.

FIFTY-FIRST REGULAR MEETING, February 7, 1882.

Major J. W. POWELL, President, in the Chair.

The election of Capt. C. E. Dutton, U. S. A., as an active member of the Society was announced.

In accordance with the Constitution the retiring President delivered his annual address upon THE OUTLINES OF SOCIOLOGY.*

FIFTY-SECOND REGULAR MEETING, February 21, 1882.

Dr. ROBERT FLETCHER, Vice-President, in the Chair.

The CHAIR stated that Mr. Petroff, whose communication was the

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* Printed in Vol. I of Transactions, pp. 106–129.

only one on the program for the evening, had notified the Council that, owing to illness, he would not be able to read it, and the Society adjourned at 8.30 p. m.

FIFTY-THIRD REGULAR MEETING, March 7, 1882.

Dr. ROBERT FLETCHER, Vice-President, in the Chair.

The election of Mr. E. W. Nelson, of the Smithsonian Institution, as an active member of the Society, was announced.

Mr. IVAN PETROFF then read a paper on the "LIMITS OF THE INNUIT TRIBES ON THE PACIFIC COAST."*

DISCUSSION.

Mr. NELSON, who had spent much time in Alaska, spoke of a mixed tribe, or race, intermediate between the Innuit and the Tinné Indians, which he had met while there, and which he thought to be identical with another interior tribe, though modified as to language and customs. He also mentioned an Eskimo tribe, supposed to have immigrated from Northeastern Asia, but which had become much assimilated in language, customs, etc., to the Alaskan Indians.

Mr. GATSCHET spoke of the Aleuts, and inquired whether any indications existed that they had migrated from Asia. He said there was no such thing as an originally island tribe; they must have come from some part of the main land. He also commented on the derivation of the word Aleut as affording some clue to their origin.

Mr. PETROFF replied that the words Aleut and Innuit were probably identical in origin, and that he had found Aleuts at Bristol Bay, and that certain characteristic cooking utensils of that tribe had been taken from kitchen refuse on the main land, which proved their former occupation of those parts.

Prof. MASON reproduced some of Mr. Dall's arguments to establish the great antiquity of the human occupancy of Alaska. He

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* Printed in Am. Nat., XVI, No. 7, 1882, pp. 567–575.

also inquired what had been the effect of the change from Russian to American ownership of the territory.

To the latter question Mr. Petroff replied that under Russian rule the tribes were not allowed to move, but that now there were no restrictrions, although they did not manifest much disposition to migrate. He thought that the population showed no marked tendency either to increase or decrease; at Cook's Inlet there were only eighteen less persons in 1880 than in 1868, although it was a notoriously unhealthy locality. He apprehended, however, that the recent introduction of intoxicating liquors would soon begin to tell upon the population. Formerly no such beverages were in use except a mild drink made from meal and called *kwak*, but in 1876, a still was erected by the whites at Cook's Inlet.

Mr. Nelson stated that he had noted a marked decrease in the population of certain localities, but that he was inclined to attribute this result chiefly to the almost total extermination in those parts of the reindeer.

Dr. King asked whether infanticide had been observed among the Indians of Alaska, and also what were the marriage customs.

Mr. Petroff replied that he had never seen any traces of infanticide. He said that the marriage ceremonies were very simple, and in some tribes scarcely existed at all. The Innuit were nearly all members of the Russian church. Those on Torriac bay were monogamous, and appeared to treat their wives kindly. The natives of Prince William Sound were in the habit of taking wives from them, in most cases simply purchasing them. Wife-lending prevails as a rite of hospitality, and he thought that this custom had done much to mix the blood of the different tribes.

In reply to further questions he stated that the Innuit tribes were sometimes without chiefs, and that each tribe had its totem.

Mr. Henry Baker asked whether there was any danger that the United States would ever become involved in war with any of these Indians, and Mr. Petroff explained that, owing to their paucity of number, no serious results need be apprehended. The more western tribes were all peaceable, and only the lower Thlinkits and Koloshes were disposed to be hostile; these numbered some 5,000 or 6,000, and, owing to the ease with which they could retreat to British soil if attacked, they might make trouble. The Indians around Cape Prince of Wales had a bad reputation, but the interior

tribes were too thinly scattered to cause any alarm. The Aleutian Islanders were thoroughly christianized.

FIFTY-FOURTH REGULAR MEETING, March 21, 1882.

Dr. ROBERT FLETCHER, Vice President, in the Chair.

Prof. G. BROWN GOODE, Assistant Director of the National Museum, read a paper on "THE CLASSIFICATION OF OBJECTS IN THE NEW NATIONAL MUSEUM IN ITS RELATIONS TO ANTHROPOLOGY."

Hectograph copies of an elaborate synopsis of the classification proposed were distributed to the members.

OUTLINE OF A SCHEME OF MUSEUM CLASSIFICATION.*

1. Mankind; 2. The Earth as Man's Abode; 3. Natural Resources; 4. The Exploitative Industries; 5. The Elaborative Industries; 6. Ultimate Products and their Utilization; 7. Social Relations of Mankind; 8. Intellectual Occupations of Mankind.

DISCUSSION.

Prof. MASON referred to the fundamental division of objects into those which were actually represented by specimens and those whose nature only admitted of some descriptive illustration, and also commended the proposed innovation of uniting, so far as required for the purpose, the elements of a library with those of a museum as popularly understood. He further pointed out the unavoidableness of a certain amount of overlapping in so extensive a classification, and inquired whether the head "Inorganic Matter," placed under "Natural Resources" in the synopsis, would not more naturally fall under the preceding division "The Earth as Man's Abode," and similarly of "Force."

Prof. GOODE replied that under "Inorganic Matter" it was proposed to arrange the mineralogical and chemical substances, and under "Force," only such apparatus as are used in illustrating

*An analysis of the scheme was printed in the Proceedings United States National Museum, 1881. Appendix. No. 13.

the nature of force in the abstract, such as the lever, pulley, inclined plane, etc.

Dr. Rock remarked that the overlapping that would occur was no objection and would not necessarily constitute duplication, since each re-appearance of the same substance would present it in a changed form. He instanced the case of silver, which would appear primarily as bullion, then as coin, and then in the various arts, where the crude metal need not be repeated.

Dr. Fletcher suggested the value of cards containing cross-references to the same object in other forms.

Prof. Mason thought that it would be well to have the busts of representative men placed alongside of their achievements, as *e. g.*, the bust of Stephenson with the steam engine.

Prof. Goode said that such duplications would be introduced wherever a purpose could be thereby best subserved. He spoke of the department of "Human Achievement," placed at the end of the syllabus, as to some extent theoretical, although it was hoped one day to introduce this feature. In this department would be displayed samples of the most finished works in every field of industry and human undertaking, the best productions of the greatest dramatists, poets, sculptors, engravers, painters, etc., and the finest specimens of textile fabrics, glassware, pottery, etc., that had ever been manufactured.

Mr. True asked how such a subject as philosophy, for example, could be represented.

Prof. Goode said that this could be done by exhibiting the works of philosophers accompanied by diagrams of their systems.

Mr. Hutcheson spoke of the importance of exhibiting in a separate department the great epoch-making books of all ages.

Prof. Goode further illustrated his scheme by a detailed description of how the origin, progress, and present status of the science of fish-culture might be illustrated in the museum.

Dr. Fletcher inquired whether it was intended that visitors should be allowed to use the books thus placed on exhibition.

Prof. Goode replied that this was contemplated to a certain extent and might be accomplished by placing a standard work on each subject on a shelf adjacent to the cases in which the subject is illustrated.

Dr. Rock spoke of the general lack of descriptive labels in museums, and thought it would be useful to have a manual, the

best extant, accompany each special department, as *e. g.*, mineralogy.

Mr. HUTCHESON mentioned the need of good model guide-books, and named as one of the best of this class the *Friedrich's Bausteine.* He also called attention to the place assigned to "religious organizations and systems" under the general head "Moral condition of Man," and said he thought it would more naturally fall under "Social Relations."

Mr. WARD concurred in this last view, at least in the abstract. He also reverted to Mr. Hutcheson's previous suggestion relative to the exhibition of epoch-making books, and spoke of the educational effect of such a feature on young persons who might desire to lay out a course of reading and wish to avoid the mass of literature of an ordinary or inferior quality which makes up the bulk of all great libraries.

Prof. GOODE said that such a collection would come under the department of "Human Achievement." He also spoke of the guide-books, the preparation of which is contemplated.

Mr. TRUE remarked upon the satisfactory manner in which the proposed system gets rid of mere curiosities. He said that the commonest objects were, from the practical point of view, the most important, and yet they were often evanescent and difficult to obtain.

Prof. GOODE illustrated this by the effort the museum authorities had been obliged to make to obtain a specimen of the planchette.

FIFTY-FIFTH REGULAR MEETING, April 4, 1882.

Colonel GARRICK MALLERY, Vice-President, in the Chair.

The election of Dr. WM. H. HAWKES, Acting Assistant Surgeon, U. S. A., as an active member of the Society, was announced.

The Curator reported the following gifts:

From the AUTHOR.—Hiawatha and the Iroquois Confederation; A Study in Anthropology. By Horatio Hale. A paper read at the Cincinnati meeting of the A. A. A. S., in August, 1881, under the title of "A Lawgiver of the Stone Age." Salem, Mass., 1881, pamph., 20 pp.

—— A paper entitled "The Manuscript Troano." By Prof.

Cyrus Thomas. Taken from the American Naturalist for August, 1881, pp. 625–641.

From the AUTHOR.—A pamphlet entitled "A preface to, with extracts from, A Book of the Beginnings." By Gerald Massey. 28 pp.

—— Mittheilungen aus der anthropologischen Literatur Amerikas. By Dr. Emil Schmidt. Essen, 20 pp., 4to.

From the PUBLISHER.—Military and Naval Advertiser and Book Record. Washington and New York, December, 1881.

From the SOCIETY.—Mémoires de la Société d'histoire, d'archéologie et de littérature de l'arrondissement de Beaune. Deuxième série. No. 1. Beaune, France, 1881, 2 parts.

From Dr. OSCAR LÖW.—Sitzung der Anthropologischen Gesellschaft zu München, vom 16 December.

Prof. O. T. MASON then read a paper on "THE TREATMENT OF ABORIGINES BY COLONISTS OF HIGHER RACES," of which the following is an abstract:

The author of the paper, believing that several very important questions in anthropology depend upon the knowledge of this subject for a proper solution, attempted to group together a mass of facts gathered from a variety of sources. The various methods of intrusion upon occupied areas were illustrated by examples of ancient and modern colonization, such as the Jews into Palestine, the Phœnicians and Greeks into the seaports of the Mediterranean, and the Romans into their conquered provinces. The two conquests of England by the Romans and by the Anglo-Saxons and Jutes were adduced to illustrate the effect of yielding or of stubborn resistance.

The freshest and best examples were accredited to Sir Bartle Frere, who had studied the subject thoroughly both in British India and in Southern Africa.

In the course of the paper the author treated of the wide difference always existing between theories of occupation as held by the home government and the real conduct of the intruders towards the natives; the effect of changed clothing and environment, of spirit-drinking, of sexual diseases and of epidemics, the changes wrought in the Pariah classes by education, the tendency to destroy the aboriginal peoples, and the best method of establishing a government over the lower class. As history is ever repeating itself, it was held that the careful study of the methods and results of

various modes of colonization would assist the modern civilized governments in the discharge of their duties towards the aborigines within the territories over which they have extended their sway.

DISCUSSION.

Col. MALLERY pointed out certain analogies between the facts presented, and those which have attended the settlement of America by the whites.

Dr. ROCK drew the contrast between the effect of European occupation of North and South America, that whereas the amalgamation of races has been slight in the former it is the rule in the latter. He said that in many parts of South America it was considered an honor to have descended from Indian ancestors, and he thought four-fifths of the people of that continent had Indian blood in their veins; at least such was the case at Parana and along the Rio Negro. Even those who claimed to be pure Castilians were rarely wholly pure.

Col. MALLERY stated that what had been said of North America was not entirely true of Canada.

Col. SEELY remarked that in the Saxon invasion of England no assimilation of races took place, while invasions and migrations on the Continent of Europe were always accompanied by a mixture of races. He then drew the parallel with respect to the colonization of America. The portions colonized by the English exclusively showed no mixture with the aborigines, but the portions colonized wholly or in part by the Latin races showed such mixture. In Canada it was the French and not the English that had amalgamated, while in Mexico the Spaniards evinced the same readiness to combine with the natives that they did in South America.

Mr. WARD pointed out, in support of Col. Seely's statement, the peculiarly isolated position which the United States and Territories occupy in this respect, and maintained that this furnished conclusive proof that it was neither the latitude and resultant climate nor any essential difference between the character of the more northern and more southern tribes of Indians which caused their destruction, but that it was simply due to the different characteristics of the colonizing races; that while the Latin races readily amalgamate with the Indians, the Teutonic races, and particularly the Anglo-Saxon, have a strong aversion to doing so.

Prof. MASON thought that the failure of the Anglo-Saxons and

Britons to intermix was largely due to the unwillingness of the latter.

Dr. PRENTISS said that the product of amalgamation was necessarily an inferior race. He gave the views of Bishop Andrews on the Mexican race. The mixed-bloods are now largely in the majority. Some of the finest men in the State, such as the late President Juarez, are full-blooded Indians, and proud of their pedigree.

Col. SEELY said the same was true among the Cherokees, who are proud of their pure Indian blood.

Prof. MASON said he had been told that the Scotch inhabitants of some of the Southern States had always taken kindly to the Indians, and that quite a Scotch-Indian stock had resulted.

FIFTY-SIXTH REGULAR MEETING, MAY 2, 1882.

Colonel GARRICK MALLERY, Vice-President, in the Chair.

The Curator reported the receipt of the following gift:

From the EDITOR.—Archivio per l'Antropologia e la Etnologia. By Dr. Paolo Mantegazza. Vol. XI, pt. 3. Florence, 1881, pp. 197–489, 2 pll.

Rev. J. OWEN DORSEY then read a paper on "THE GENTILE SYSTEM OF THE IOWAS," of which the following is an abstract:

The Iowas belong to that linguistic stock which has been known as the Dakotan family, but which, in future, must be called the Siouan family. They were mentioned by Marquette, in 1673, and located on his map between 40° and 41° N., west of the "Pana" (Ponkas), and northwest of the "Maha" (Omahas) and "Ototanta" (Otos). Marquette called them "Pahoutet."

These four tribes were originally parts of the Hotcañgara or Winnebagos.

Meaning of the word "Iowa" and of their real name, "Paqocte."

Origin of the Iowas.

Tribal circle. Two phratries; gentes.

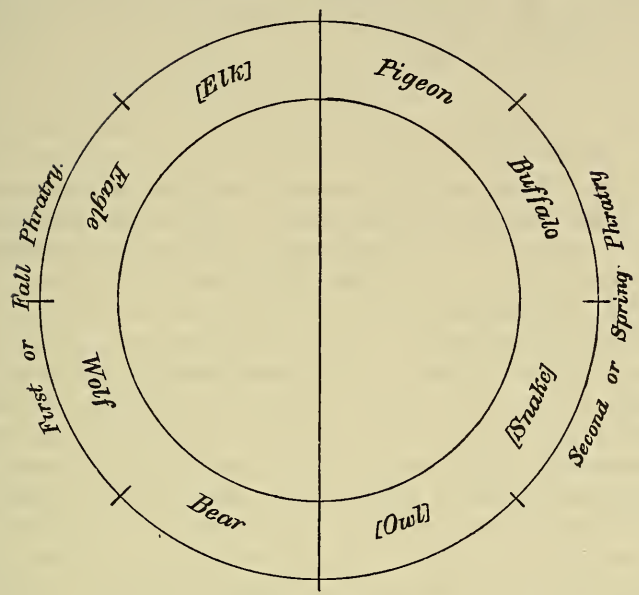
Mythical origin of the gentes.

Present organization of the tribe.

Rights and duties of gentes.

Account of their sub-gentes.

IOWA TRIBAL CIRCLE.



Mr. LESTER F. WARD then read a communication on "SOCIETY AS A DOMAIN OF NATURAL FORCES." The paper was illustrated by elaborate charts prepared for the purpose by Dr. Frank Baker. As the paper consumed the time of the Society up to the hour of adjournment the discussion was postponed.

FIFTY-SEVENTH REGULAR MEETING, May 16, 1882.

Major J. W. POWELL, President, in the Chair.

The election to active membership of Mr. James H. Blodgett, special agent of the Census, and Mr. Edwin Coombs, of the Sixth Auditor's Office, was announced.

The President also laid before the Society for its action the project for the formation of an Academy of Sciences, as prepared by the committees of the Anthropological, Philosophical, and Biological Societies in joint session.

The first paper was the conclusion of Mr. WARD's communication, commenced at the previous meeting, on "SOCIETY AS A DOMAIN OF NATURAL FORCES."

DISCUSSION.

Dr. FRANK BAKER said:

I do not rise to make an exhaustive examination of the remarkable paper presented by Prof. Ward; it is evidently the result of months, perhaps years, of close study, and it would be mere impertinence to review a scheme of such magnitude without well weighed consideration.

While I will not enter into any proper discussion of the subject, I wish to call attention to the extreme importance of the views presented. If there is any possibility of controlling the forces which actuate society in the same manner as the physical forces are controlled, the results which may ensue are simply incalculable.

The usual attitude of political economists towards this subject is that of letting the forces entirely alone. They are considered too vast, our means of control too subtle and weak compared with their wide-spread scope and influence. Each individual is considered but a speck, swept onward by the wide-reaching whirl of the stream towards an illimitable and unknown ocean.

The aspect of man in this condition is truly a tragic one. From a conception of its infinite pathos comes that strange malady so common to young and intelligent minds, arising mainly during this nineteenth century, and which has, by the Germans, been named *Weltschmerz*, or world-sickness. This strange affection overgrows the young political mind like a blue mould, disabling it from a proper appreciation of its duties. Even the robust and healthy mind of Goethe was tinctured with it, Saint Simon shot himself while under its spell, Matthew Arnold and Carlyle have it, even the clear logical mind of John Stuart Mill was not entirely free from it. One of its most pathetic exponents is none other than Tennyson. His poems, particularly those published some years ago, are interfused with a minor wail of despair at the prospects of humanity. The utmost he can attain to is to say:

> "We only hope that good shall fall
> At last—far off—at last, to all,
> And every winter change to spring."

Robust and muscular science looks with some disdain at weak exhibitions of feeling, but unfortunately that attitude cannot be impressed upon the great body of non-scientific, pseudo-scientific, and semi-scientific members of society. The views of Prof. Ward seem eminently calculated to counteract this green sickness or mental chlorosis. For if we may hope to intelligently direct the social forces without waiting for the far off operation of natural selection, even the least of us may light some small taper which shall not be without effect. If the mental energy of a train-robber, or intellectual activity of a counterfeiter can be turned to the benefit of society as we direct the destructive force of steam or wind, it will indeed be a consummation devoutly to be wished.

Political economy has been called "the dismal science," and perhaps from an instinctive feeling of this powerlessness of the mind to control economic laws. The impulse which I have to relieve a street beggar can be shown to be economically wrong, and if I have no other means of expressing the charitable impulse, it is a positive loss to society. The various schemes of sociological reformers, Comte, Fourier, and others, are attempts to direct such force into proper channels. I think that no one who has ever listened to the enchanting promises of these systems ever entirely forgets them. Fourier's plans of combining all mankind into immense associations for mutual advancement, where each individual should follow out the law of his highest attractions, can never entirely vanish from the hopes of mankind. The absolute failure of all attempts to realize this golden dream do not necessarily prove that it is unscientific and impossible. Like other human inventions it may fail again and again, and yet be crowned with success at last, should a proper scientific basis be found to work upon; and it appears to me that, if ever the views of the Utopian school are realized, it must necessarily be by working in accordance with the views formulated by Prof. Ward.

President Powell remarked that the doctrine of Malthus was untrue; that natural selection could not be considered a law of anthropology; that social organization consisted essentially in a repeal of that law and substituted for the law of competition that of mutual assistance. Man has progressed, 1, through the law of *mutual protection*, and 2, through the law of *culture*. The three stages of culture are 1, acculturation; 2, education; 3, investigation. He criticised the terms "Parasitic Occupations," "state-

craft," "priestcraft" and maintained that all these functions were necessary to the existence of society.

To these latter strictures Mr. Ward replied that no stigma was intended to be attached to any of these terms; that the scheme in which they occurred was exclusively economic, and that as these occupations were neither productive or distributive, they had been called parasitic. Neither their necessity nor their usefulness was questioned, but they were used merely to denote that those thus employed had nothing to do with the production or distribution of wealth.

Mr. Frank H. Cushing commenced a paper on "Life in Zuñi," but the hour of adjournment arrived before its conclusion.

Special Meeting, May 23, 1882.

Colonel Garrick Mallery, Vice-President, in the Chair.

At the request of several members of the Society a special meeting was held, for the purpose of enabling Mr. Frank H. Cushing to complete the reading of his paper on Life in Zuñi. As notice had been given that members might invite their friends there was a large attendance. Mr. Cushing's paper described the topography of Zuñi and the mode of life and habits of the tribe more particularly as illustrated in the career of a young warrior of the 16th century, including the initiation rites of several of the Zuñian orders into which he had himself been admitted. Characteristic songs and dances were given by members of the tribe, who were present in costume, Mr. Cushing participating. The enthusiasm of the actors in this strange drama was equaled only by the absorbing attention awakened in those who witnessed it. The Zunis were quite as much interested in the customs of their auditors, as the latter were in the dress and ceremonies of the last remnant of the proud Aztec. Many distinguished anthropologists were present, and both by their suggestions and questions aided in drawing from Mr. Cushing and his protegés valuable information concerning Indian sociology.

FIFTY-EIGHTH REGULAR MEETING, NOVEMBER 7, 1882.

Colonel GARRICK MALLERY, Vice-President, in the Chair.

Vice-President WELLING delivered the annual address for the Section of Sociology entitled,

THE TURNING-POINT OF MODERN SOCIOLOGICAL SCIENCE.

It is a long way from the "Republic" of Plato to the "Political Institutions" of Herbert Spencer, and yet to the student of sociology the separate points of view, respectively occupied by the Greek and by the English philosopher, are clearly within sight of each other. And it is not difficult for the student of history to pass from the standing-place of the one to the standing-place of the other, for the interval between them is bridged with abundant stepping-stones across the stream of the ages—by the "Politics" of Aristotle, the "Republic" of Cicero, the "*Civitas Dei*" of St. Augustine, the "Monarchia" of Dante, the "Principe" of Machiavelli, the "Republic" of Bodin, the "City of the Sun" of Campanella, the "Utopia" of Sir Thomas More, the "Oceana" of Harrington, the "Argenis" of Barclay, the "Leviathan" of Hobbes, and (in that wider treatment of history which looks at civil progress as a branch of universal progress) by the "*Scienza Nuova*" of Vico, the "*Discours sur l'Histoire Universelle*" of Bossuet, the "*Ideen*" of Herder, the "*Plan*" of Turgot, with numberless other histories of the progress of civilization by writers like Condorcet, Montesquieu, Buchez, Guizot, Balmes, Buckle, Draper, Lecky, &c.

And the topics discussed by Plato, though so far removed from us in point of time, have often the flavor of this nineteenth century, for as Thomas Arnold loved to remind his students while they construed with him the pages of Thucydides, the state of Greece from Pericles to Alexander the Great, fully described to us, as it is, by the works of great contemporary historians, poets, authors, and philosophers, affords a political lesson perhaps more applicable to our own times, if taken altogether, than any other period of human history anterior to the eighteenth century. In point of civilization and of sociological evolution that remoter age is much nearer to us than the chronologically nearer ages of Europe from the sixth to the sixteenth century. In Plato's "Republic" we may catch the echo of some among the latest cries of this living age, for here it is that we find

arguments for the communism of property, for community of pursuits between men and women, and for the State regulation of marriage, with a view to that *supra*-"natural" selection which, under the intelligent guidance of reason, has improved the breed of domesticated animals. It is common to say that a great progress was made in the civilization of Europe when standing armies came to supersede the institutes of feudalism and of inter-tribal warfare, but the expediency of such a step was as clearly prognosticated by Plato as by Machiavelli. Alike in the philosophical pages of Plato, and in the satirical comedies of Aristophanes, we may see that there are few social problems among us which did not find their analogues among the sprightly Greeks of the fourth century before Christ—from the agitation for "woman's rights" to the latest craze for "cheap money." That Plato had no monopoly of social theorizing and political castle-building at that early day, we may abundantly read in the *Ecclesiazusæ* and *Lysistrata* of the great comic dramatist who was his contemporary.

But the "Republic" of Plato is at the farthest possible remove from the scientific spirit which is transforming the *thought* of this modern world, as the method and products of science have already transformed the *civilization* of our age in a thousand different directions. The treatise of the great philosopher is a pure speculation—the speculation, it is true, of a great creative mind, and of a Hellenic philosopher who belonged to the party of the theorists on his speculative side, but to the party of reaction against the excesses of democracy on his practical side, insomuch that we find him giving a preference to many features in the institutes of Sparta over the institutes of Athens. In point of scientific value the "Republic" is, therefore, emptied of all significance, except as a phase of the sociological fantasies in which the ingenious mind of man may indulge when it cuts loose from "the solid ground of nature."

If Plato had discovered the value of the comparative method as an instrument of inquiry, and as a key to knowledge, there is no trace of the fact in his political visions. His high dialectic proceeds from the intuitions of the philosophical mind and from the aspirations of the human soul, as he draws them from his own consciousness, and not from any wide generalizations based on the observed facts of human society. This latter *was*, however, the method of his illustrious pupil and successor, Aristotle, and it was by the skill of Aristotle in the use of this method that he was able to organize

the thought of men for two thousand years, and under three different religious dispensations—the Pagan, the Mohammedan, and the Christian—down to the comparatively recent day when Bacon effected a new "instauration" of science by again placing the key of knowledge in the hands of men, and inviting them to its use in the study of nature, after it had been thrown away for centuries by the Schoolmen of the Middle Ages. In his great work entitled *Νομιμα*, or *Πολιτεῖαι Πολεῶν*, we know that Aristotle analyzed and compared the political constitutions of the then civilized world, embracing, it is said, not less than two hundred and fifty distinctive polities, and though this work is lost, we still have the condensed philosophy of his comparative observations in the shape of his well-known work, the *Πολιτικα*, or Politics. It is evident that Aristotle was a master of scientific method, and he applied it to the phenomena of politics according to the best lights that were accessible to him in the time when he wrote. He was as well acquainted with the comparative method of research as with the inductive method proper, for indeed the so-called comparative method is only a phase and variety of the one universal method of reasoning by induction which Aristotle explains to us in the Posterior Analytics—a phase and a variety as natural and necessary in its application to facts occurring in time as to facts occurring in space.

The eminent historian, Mr. Edward A. Freeman, in referring to the comparative method as applied in modern times to the phenomena of language, of mythology, of folk-lore, of history, and of politics, has not hesitated to pronounce it "a discovery" of the present age.* Fully concurring with him in all that he says in praise of this method, I venture to think that there is some inaccuracy in this statement. It is not "the discovery" of this method which, as he represents, has recently come to "mark a stage in the progress of the human mind at least as great and memorable as the revival of Greek and Latin learning." The method was discovered more than two thousand years ago, for it certainly was used by Aristotle as freely as by Mr. Freeman or by Mr. Herbert Spencer, but it was used by the Greek philosopher without the perception of a truth which is indispensable to the full usefulness of the method—the fact that all the phenomena of social and political life, wherever we intersect them in the path of our comparative inquiries, are bound to each

*"Comparative Politics," p. 301.

other by the law of a genetic evolution, which is logical because it is chronological, and which is universal in its application because the phenomena of civil society, however unlike they may be in different parts of the globe, or in different ages of the world, or in different stages of civilization existing at the same time, are always and everywhere the outcome of an evolutionary process, which, in the totality of its phases, can be best understood—which, indeed, cannot be *scientifically* understood at all, until the idea of this law is extended to all the phenomena of human history. Hence, as it seems to me, it is not the "discovery" of the comparative method which is the great contribution of the nineteenth century to the advance of human knowledge—(a contribution which Mr. Freeman thinks may boldly take its stand alongside of the great contribution of the fifteenth)—but the application and use of this method, as fructified by the additional conception that there is and can be no chasm in the succession of the ages, and that the days of the whole human race, like the days of the individual man, are "bound each to each by a natural piety." It is not until we clearly seize the idea that much the larger part of our social life is that which we lead by virtue of our connection with the race from which we spring, and that all the tribes of men are but parts and parcel of the same human race in different stages of social development, and, therefore, interconnected by a tie of logical congruity, that the interpretation of the lowest stages of civilization is seen to be indispensable to the proper classification and the rational explanation of all the different polities of mankind, and, therefore, to the rational explanation of that polity which may be the highest at the present day. Instead, then, of saying that "the discovery" of the comparative method in its application to language, mythology, and history dates from this nineteenth century, we should rather say, I repeat, that it is the scientific application of this method which dates from the present century; and this scientific application was impossible until the philosophic mind of the race had caught the glimpse of a pregnant truth in the discovery of the continuity of all human history. This philosophical conception dawned on the minds of thoughtful men for the first time in the seventeenth century, and though the full significance of the conception was not then understood, it helped to light the way of subsequent inquiries to a deeper and wider philosophy of history than had ever entered into the dream of Plato or the scientific reductions of Aristotle.

If, then, I were asked to mark the date when the fruitful application of the comparative method to politics first became possible, I would refer it to the time of that famous controversy in Europe when the champions of the modern age first dared to dispute with the defenders of antiquity the palm of intellectual supremacy in the matter of acquired knowledge—a controversy known in literary history as the "Quarrel of the Ancients and the Moderns,"* and in the fervent heats of which was struck out many a spark of light like that which still shines in the famous saying of Pascal, that the whole succession of men, as measured along the line of human progress during the course of all the ages of the world, "ought to be considered as one same man, who lives always and who learns continually." With this conception of universal history the human race may be said to have *oriented* itself in the person of its file-leaders, for then it was that "world-history," as the Germans call it, may be said to have got its bearings. And it is easy to see how these bearings could not have been discovered sooner. Ancient society was essentially divisive in religion, custom, and polity. National gods hedged off the nations from each other, while local institutes became the badge and bond of a patriotism which was as narrow as it was intense. In the middle ages the sense of continuity between the ages was not only lost, but the violent rupture which the barbarian incursions had wrought in the traditions of the Roman Empire seemed to have inverted the very idea of such a continuity. And for a long time after the Revival of Learning, the thoughts of men were so habitually turned backward to the landmarks of Greek and Roman culture that the interposition of these great summit-points of ancient literature, science, and art, could but blind the minds of the Renaissance generations to the perception of an evolutionary process working in the whole figure of human society and running through all the ages of the world—now on the ascending and now on the descending gradients of universal history. But when this conception *was* grasped, enlightened men set themselves at once to the

* See Perrault: Parallèle des Anciens et des Modernes, en ce qui regarde les Arts et les Sciences. Paris, 1688. The traces of the same controversy may be found in the "Miscellanea" of Sir William Temple, and in the history of the once famous disputation waged by him with Dr. William Wotton and Dr. Richard Bentley, the mocking echo of which we still read in Swift's "Battle of the Books."

writing of "philosophies of history." Before this date, it is true, St. Augustine had written his great treatise on that "Commonwealth of God" which had come to supersede the Roman Empire, but his purpose in that work was polemical rather than philosophical. Epiphanius before him had discriminated the history of civilization into "Barbarism," extending from Adam to Noah, "Scythism," extending from Noah to Terah, and "Hellenism," extending from the beginnings of idol worship to the bright efflorescence of mythology in the gay religion of Greece. But all such compendious philosophies as these were not so much reduced from facts as drawn out of their writers' minds. They bore in their whole form and pressure the marks of a subjective purpose. And all applications of the comparative method before this date, even when made by an Aristotle, were necessarily fragmentary, because they were divorced from all sense of continuity in the evolution of human societies. While, therefore, the loss of the *Nomima* of Aristotle is a loss to literature, it is probably no loss to the science of politics in the modern sense of that phrase, because that sense could not arise until the continuity of human history had been clearly comprehended, as the condition precedent of inductions wide enough to embrace the whole theory of social evolution, where each stage is anticipatory of the next, and where, therefore, the highest stage must receive some explanation or elucidation from all the stages below it; because each higher stage of civilization and of social organization is but a normal projection and logical outcome of the next lower stage.

It is, then, in this fruitful conception that we may find the turning-point of modern sociological science. It is not the comparative method, but this supplementary conception, giving to that method a new vitality and significance, which, as Mr. Freeman says, "has put the languages and the history of the so-called 'classical' world in their true position;" which has made them "the objects of a worthier because a more reasonable worship;" which has broken down the middle wall of partition between kindred races and kindred studies; and which has taught us that "the study of language is one study and that the study of history is one study."

If, therefore, in all our scientific studies of history we must, as Mr. Freeman holds, "boldly grapple with the great fact of the unity of history"—must start from the great premise that "as man is the same in all ages, the history of man is one in all ages," it follows

that the possibility of sociological science dates from the epoch when this pregnant truth first rose on the horizon of human knowledge. And it arose only in the latter part of the seventeenth century—emerging at first as a dubious speculation, then accepted as a literary thesis, then as a working hypothesis, until at the present time, with the ancillary theory of evolution, it has become the foundation and corner-stone of sociological science.

As a literary thesis and a working hypothesis, it is this conception which has begotten the long line of so-called "Philosophies of History," which date from the *Scienza Nuova* of Vico and which come down to Draper's "Intellectual Development of Europe." It was to be expected that these "philosophies," like those of Augustine and of Epiphanius, would often take their shape and color from the shape and color of the author's mind, and hence in the case of most, if not all of them, there is only too much room for the scoff with which Goethe has whistled them down the wind. In writers like Bossuet and Balmes the philosophy of history takes form and complexion from theological opinions. In writers like Schelling and Fichte, Kant and Hegel, the philosophy is made to run along the lines of certain metaphysical preconceptions. In writers like Montesquieu and Turgot, Buckle and Draper, we have, perhaps, a nearer approach to the facts of history as they are, but in them, too, we may easily discern the presence of subjective ideas which sometimes obscure, sometimes discolor, and sometimes distort the philosophical reflections of the writer. The light they let in on the facts of history is light that comes from a prism, or which has been passed through a painted medium, whereas Bacon has reminded us that for purposes of exact observation "dry light is best"—the light that suffers least from refraction and dispersion.

If such was the turning-point of sociological science, it remains to say that the science of sociology became actual in its rudiments just as soon as men began the comparative study of civil and social institutions on the theory that all the facts of society and of politics are bound into organic unity by the tie of a genetic descent, which is none the less causal and real because we are not everywhere able to discern its presence or explain the mode of its operation. If the science became possible when the unity of history was clearly perceived, the science became actual and began to crystallize in its present shape and configuration when the theory of evolution was made the frame-work on which men conducted their observations

and based their generalizations. For this theory gives us the comparative method not only as applied to the facts of all human history under a sense of their continuity and interdependence, but as applied to them under the guidance of a principle which affords the basis of accurate classification and precise definition as the indispensable preludes to scientific generalization and rational interpretation. Here, at least, the theory of evolution, or if not *the* theory, *a* theory of evolution, has absolutely no opponents; for all the wisdom of political reformers, as well as all the wisdom of political conservatives, is compelled, consciously or unconsciously, to make its account with the substantial doctrines of the evolutionary hypothesis. The political reformer knows himself to be wise only when, in agitating for social and civil changes, he has found what Canning used to call "the line of *safe change*," and when he moves upon it. The political conservative knows himself to be wise only when he avoids the anachronism of clinging to obsolete institutions, and learns to accept in time the new social and civil modifications which are required to meet a new configuration of public opinion, a new aspiration in the sphere of government, or a new evolution in public economy. The history of all political changes, whether they come too soon or come too late, does but serve to point the same moral. In a word, all the hidden mystery of politics considered as the science and art of state-craft, is a mystery hidden in the womb of that genetic evolution which is ever living and working in the figure of human society, and which, according to the elements and forces involved in any given society, or at any given epoch, is seen to work sometimes for the rise and sometimes for the decline and fall of States. And this mystery of practical politics it is the mission of sociological science to bring, step by step, into the clear light of philosophical cognitions based on facts as broad as the phenomena of civilization, and then to colligate these facts into a rational unity by principles of interpretation, which shall give to them the consistency of logical coherence as the basis and stepping-stones of the prevision and prediction which are the sure test of a science. It is because the principle of genetic evolution is radicated in the very structure of society that all social changes, in order to be beneficent, must come with nothing more than the birth-pangs of a natural process. If they come with the violence and shock of a Cæsarean operation we must expect that they will mangle, if not destroy, both the old body politic and the

new embryonic growths with which that body is teeming. This maxim of practical politics is a maxim as old as the art of statesmanship, but the whole truth of the maxim lies in the principle which modern sociological science has only recently come to formulate. Indeed, the very figure which I have just used to illustrate this scientific truth was used nearly three thousand years ago by a Hebrew politician who complained that in his day of political trouble and rebuke "the children were come to the birth, but there was not strength to bring forth," as to-day the politicians of more than one country in Europe take the name of "Opportunists" because they profess to be watching and waiting for that tide in the affairs of men which, when taken at the flood, leads on to fortune in politics as well as in all other enterprises of pith and moment. But the fact and the law of a genetic evolution lie at the bottom of all political "opportunism," whether politicians are aware of it or not.

If all men are consciously or unconsciously agreed as to the presence of a natural evolution in the formation, growth, and decay of human societies, the expositors of sociological science are as yet far from being agreed as to the way in which this natural evolution works, the manner in which it should be described or the name by which it should be called. As the biologist's "natural selection," in its effect on the life-history of animals, depends mainly on their isolation and on their individual feebleness in the struggle for existence, while man is everywhere and always "a political animal," to use the phrase of Aristotle, and as such is not simply gregarious, but even in his rudest civil organization makes provision beyond all other animals for the protection of weaker members against the operation of a physical natural selection, it follows, according to Mr. Wallace, that the action of "natural selection" is checked in the sphere of human society.* And not only does man check the operation of "natural selection" by co-operation and the division of labor, but, by the cultivation of plants and the domestication of animals, he substitutes for it, says Mr. Arthur Mitchell, a selection of his own which is above "nature," and contrary to "nature," insomuch that the very theory of civil organization, its procuring cause as well as its *raison d'être*, must be sought in the struggle of

*A. R. Wallace: Contributions to the Theory of Natural Selection, p. 339. London, Macmillan & Co., 1871.

man to defeat the operation of this natural law; and hence, as Mr. Mitchell holds, "the measure of success which attends the struggle of each band or association so engaged is the measure of the civilization it has attained."† And because the present stage and the actual form of culture in the highest civilizations have been reached by "counteracting and suspending the righteous and salutary law of natural selection," as natural selection acts on lower animals, Mr. W. R. Greg fears that in so doing we are traversing the law which has been ordained by nature "for the preservation of a worthy and improving humanity." And Mr. Herbert Spencer supposes himself to see not the signs of a wholesome progress, but the marks of a pestilent reaction—the very survival of "militarism"—in the present political agitation for sundry schemes of coercive philanthropy. He refers especially to the schemes of reformers who, not satisfied with State inspection and regulation in mines, factories, ships, lodging-houses, bake-houses, and other domestic establishments, even down to our bath-rooms and water-closets, have recently supplemented their propagandism and sanitary dictation by clamoring for the enactment of "sumptuary laws" against the use as well as the abuse of any and all intoxicating liquors. All legislation of that kind seems to Mr. Spencer an anachronism—a reaction in the direction of "militarism"—that social state which, planting its roots in the mediæval feudalism, should be left more and more behind in the progress of modern civilization. This progress, as Mr. Spencer holds, is mainly due to what he calls "industrialism," that is, the state of "*voluntary* co-operation which a developed industrial activity necessitates." Civil coercion and social prevention are, in his idea, the maxims of "militarism." Civil freedom and natural economical selection are, in his idea, the maxims of the later "industrialism."

Now, in all this conflict of opinions and jargon of dialects it seems to me that there is nothing more than some confusion of ideas leading to a worse confusion of nomenclature. The law of natural selection works, I conceive, as truly in the figure of human society as in the realm of plants and animals, but it works to ends which are greatly more complex as well as greatly higher in the former than in the latter. In each realm it works according to the genius

† Arthur Mitchell: The Past in The Present, p. 325. New York, Harper Bros., 1881.

and quality of the subjects embraced in that realm—the natural selection of the plant world being different in quality from the natural selection of the brute world, and the natural selection of the human world being different in quality from that of both the former which it subordinates to its use. "There are diversities of operation, but the same spirit." Natural selection in human society tends not only to the evolution of the physical structures which are fittest to survive, but also and pre-eminently, in connection with these, to the evolution of the intellectual and moral formations which are fittest to survive. From man's higher place in nature it is but natural that he should wage war with the natural selections below him, from the control of which he has emerged by virtue of his higher organization, and which he treads upon as the mark and measure of his dominion over the vegetable and animal kingdom. But in working above the lower phases of this natural selection, he works in entire accordance with his own higher nature and with his place in the natural world; for being endowed with a nature which has intellectual ends through and beyond the physical ends of his being, and moral ends through and beyond the intellectual ends of his being, he does but make a natural selection which accords with his higher nature when he subordinates the lower world to his uses, and, within his own realm, subordinates, under certain limitations, the physical to the intellectual, and the intellectual to the moral. The whole world is the theatre on which man has been enacting this higher natural selection, and all human history is the record of its successive acts and scenes. "There is something curious," says a British thinker, "in a contest between two kinds of strength. The naturalist seeks for the spectacle in the animal world; the historical eye sees it in the annals of parties and movements."*

It would seem, therefore, that the struggle of man for a higher civilization is not so much an attempt on his part to evade the law of natural selection as an attempt to raise that law into the higher planes of an ever-expanding intelligence and an ever-increasing morality, where the selection, without ceasing to be genetic and natural, tends to become more and more teleological in point both of intellectual and moral purpose. For an ever-expanding intelligence man depends on the natural selections, that is, on

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*J. B. Mozley: Essays Historical and Theological, Vol. I, p. 166, New York, Dutton & Co., 1878.

the gradually acquired appetencies and aptitudes of his intellect, which, according to the law of its evolution, reads the universe slowly backward from effects to causes and from tendencies to laws of movement; because the universe, as man finds it, has moved slowly forward to the state of its present cosmical order. Science is genetically retrogressive in its inquiries and discoveries, because nature has been genetically progressive in her operations and products. And hence, the sciences of the world are developed in a fixed genetic order, because the subject-matters of which they treat have been evolved in a fixed genetic order. And as a natural intellectual selection is seen in the orderly and chronological growth of the sciences, so also a natural moral selection is seen in the orderly and chronological growth of the public virtues which have refined the manners and improved the customs of civilized men in this nineteenth century. Natural selection works here to the evolution of clearer moral ideas based on the discovery of the customs which are fittest to survive because they best subserve the purposes of social utility and most clearly conform to the intuitions of the human reason. This growth, like the growth of science, is a genetic evolution. Moral changes in society do not take place *per saltum*. Private morality in its best estate is a slow growth, because of the weakness in which it begins and of the temptations by which it is surrounded in the struggle for existence. Public morality in its best estate is a still slower growth, because of the weakness in which it begins, and because of the greater difficulty with which moral ideas are integrated in the collective consciousness of a whole community. But as without *some* morality a society cannot exist, there is a needs-be that the law of a natural moral selection should be perpetually present (however invisible and unconscious the mode of its operation) in those differentiations by which the moral sense and practices of one age or land are distinguished from the moral sense and practices of another age and land. Where public customs grow wiser and better and purer, it is under the law of a genetic moral process that they slowly unfold themselves in the sphere of society; and where they decline, it is from the reciprocal interaction of the same inner and outer factors, bringing about a lower moral equilibrium between the selective forces of virtue and the aggregate mass of ideas and interests against which they work and which work against them. And in the light of these principles we can see why it is and how it is that free institutions are always and

everywhere the slow, gradual, and genetic outcome of a secular process, under which civil and political regulations have been transferred, by a natural moral and intellectual selection, from the sway of subjective customs and ideas rooted in political ancestor-worship, to the sway of objective rules of civil right and political expediency, capable of being substantiated to the intelligence and morality of the living age which accepts them. And in the light of these principles we can see why it is and how it is that sometimes an old civilization, like that of China, may seem to be comparatively stationary. It is because the intelligence of the people in its highest aspirations never aims to rise above the standards of a fixed scholastic system, furnished to the Chinese by a few classics, and because the morality of the people in its highest ideals never conceives of anything better than the ethics of ancestor-worship, as formulated for the Chinese by Confucius. "The Chinese civilization," says Hartmann, "is the product of a culture which has been stagnating for thousands of years, and which has been outlived even to utter tediousness."

In the competitions which regulate the *modus vivendi* of nations, each nation must keep pace with the natural selections of an advancing intelligence if it does not wish to be pushed to the wall; and each advance in civilization, considered on its intellectual side, depends on the number, intelligence, and industry of the workers who, released from the necessity of laboring with their hands for their daily bread, are paid by society or by the State to work with their brains for the public welfare. It is in such a community that a natural intellectual selection works to the discovery of an ever-growing science as the basis and condition of an ever-growing social amelioration.

And hence it is that in the light of these same principles I refuse to take any share in the panic fears of Mr. Greg when he argues that modern society by its excessive altruism—by the provision it makes for the deaf, the dumb, the blind, the halt, the maimed, the insane, the improvident, and the thriftless, is in danger of degrading the human species by doing violence to the law of natural selection in the physical sphere. All observation teaches us that nature is everywhere and always more careful of the type than of the individual, and it is only to the individual that this public charity extends. Moreover, the high public morality which pleases its sense of duty by extending this benevolence to individuals is always

accompanied with the high intelligence which, by an improved medical science and an increased attention to the methods and principles of public sanitation, looks to the improvement of the physical health of the masses at large. When sanitary and medical science shall have reached the stage of a complete prophylaxis against all preventable diseases, we shall have reached the state of an ideal commonwealth in the matter of the conditions which precede a vigorous physical manhood—a state in which the disturbing influences cited by Mr. Greg will vanish out of sight.

And it is a curious fact, as serving to show how subjective these fears of Mr. Greg are, that while *he* complains because we take too much care of the feeble individual, and will not "let the poor, the incapable, the lazy, and the diseased die," Mr. Spencer complains that we are in danger of taking too much care of the public health, by extending to society the principle of prevention—a principle which, to his fancy, symbolizes with the old "militarism"—whereas the cause of social progress demands, as he thinks, that we should give extension only to the principle proper to the industrial type, which looks not to the *prevention* of injuries, but to the providing of quick and costless remedies for the injuries, minor as well as major, which citizens inflict on one another in a state of freedom.

But, in fact, this public prophylaxis is not "militarism," as Mr. Spencer supposes. It is "industrialism" organizing and arming itself, that, by division of labor for purposes of self-protection, it may encounter the least possible hindrance in its operations. The sinks and water-closets of our city are inspected, not to give the citizen a taste of "militarism," but to insure for every citizen the greatest possible freedom from loss in the prosecution of his industry. The small-pox patient is removed from his home and isolated in the wards of the small-pox hospital, not that the precincts of one home may be invaded by the public doctor, but that the precincts of the fewest possible homes may be invaded by the pestilence that walks in darkness and the destruction that wastes at noon day. It is really an alert and intensified "industrialism" which seeks these guards in the public administration; and as the efficacy of these guards depends on the intelligence and honesty of public officials, we see how their institution reacts on the politics of a people, by tending to the creation of an amended civil service as part and parcel of the general social amelioration. And this explains why it is that political questions which, in the first stages of natural selection,

are constitutional, tend to revolve more and more in the sphere of administration after a polity has been definitely ascertained and settled by the organic law of the State.

It is because an immense and a partly invisible natural selection, involving a vast complex of physical, intellectual, and moral forces, is perpetually going on in society, that no age is able fully to understand itself or to construe itself in the scheme of human progress. Natural selection in both the vegetable and animal realms works to the evolution of certain fixed results under the pressure of forces which are immanent without being realized, and which, therefore, move to their predestined ends without conscious aid or direction from the totality of the subject-masses within which and for which they act. The higher natural selection which now goes on in the sphere of society has, in a large measure, this same mark of unconsciousness, notwithstanding the infinitely greater degree in which man, as compared with the brute, is able to construe his relation to his fellows and to the world around, below, and above him. But it is the aim of sociological science to bring the collective consciousness of the race within the sphere of knowledge, not only for purposes of curiosity, but for the purposes of practical statesmanship. And if the time should ever come when the collective consciousness of a nation shall be brought within the sphere of knowledge, not only for the ends of theoretical science, but also for the ends of practical utility in politics, that fact would not put an end to natural selection. It would simply raise natural selection to the high plane in which the unconscious selections of a short-sighted ignorance and a self-destroying vice would be swallowed up by the conscious selections of a far-sighted intelligence and a conservative morality. Nor would such a natural selection cease to be genetic because it had become intelligently and intelligibly teleological in its whole drift and purpose. All the tentative efforts of a natural social selection are the dim strivings of man towards this perfect teleology. We ought to be able to see as clearly in the light of a constructive science as Shakespeare saw in the light of his constructive imagination, that—

> " Nature is made better by no mean
> But Nature makes that mean: so, o'er that art
> Which you say adds to nature, is an art
> That Nature makes. You see, sweet maid, we marry
> A gentler scion to the wildest stock,

> And make conceive a bark of baser kind
> By bud of nobler race; this is an art
> Which does mend Nature, change it rather, but
> *The art itself is Nature.*"

So true is it, as Sir Thomas Browne has philosophized, that "all things are artificial, for Nature is the art of God."

It is because of the genetic evolution and the unconscious teleology which now go on in the figure of society that many social and political questions which are too large and too complex to be settled by the heads of the State, are often seen to get themselves settled in a highly organized society by what is called "the logic of events," that is, by an unconscious natural selection which compels a given solution; just as in political economy the immense and invisible natural selection of supply and demand works to an equilibrium which, though wrought without any consciously directive intelligence, is wiser and better than would be that of any superintending head in the present state of political knowledge.

I am aware that Mr. Galton supposes himself to discry a sign of weakness rather than a promise of progress, in the fact that our public wants are higher than the public intelligence and morality. He fears that the foremost laborers who have created modern civilization are beginning to show themselves incapable of keeping pace with their own work. "The needs of civilization, communication, and culture, call," he exclaims, "for more brains and mental stamina than the average of our race possess." "We are in crying want," he adds, "for a greater fund of ability in all stations of life; for neither the classes of statesmen, philosophers, artisans, nor laborers are up to the modern complexity of their several professions."* But instead of seeing in this fact a sign that the British race is "over-weighted," and is likely to be "drudged into degeneracy," how much more scientific and philosophical it would be to see in it the indispensable stimulus, and, therefore, the hopeful promise and pledge of social progress under all these heads. It is only in stationary civilizations that there is no call for "more brains and stamina" than the average statesman and artisan possess. It is because of the moral and intellectual quickening inspired by the very demand which is so distressing to Mr. Galton that "fifty

* Francis Galton: Hereditary Genius, p. 345. New York, D. Appleton & Co., 1871.

years of Europe" have come to be better than "a cycle of Cathay."

I have thus adverted to a few of the difficult and weighty questions which may be said to take their hopes of solution from that great turning-point in sociological science which was reached in the seventeenth century, when men came to perceive for the first time the unity of human history, and when the collective story of man was gathered for the first time into crude generalizations as wide as the observed facts of the race. Standing as we still do on the mere threshold of that science, I am well aware that the purple visions of the "hurrying philanthropist" have no place in the sober forecast of the anthropologist; but just as little place is there for the pessimism and despondency in which a few eminent thinkers here and there seem disposed to indulge in the name of science. All such dogmatism is as little justified by what we know as by what we do not know.

DISCUSSION.

Prof. MASON said that he was reminded of Gustav Klemm's views of anthropological study, and the tendency to treat every subject broadly and comparatively, and not *ex parte*, or as something requiring to be defended. Language was now so studied, and even religion as a fact in society was coming to be regarded as a science. He spoke of the tendency of those who furnish the facts for the anthropologist to give them a subjective coloring, and of the necessity of taking this fact into account in collating them, and said that it would yet be seen that anthropology must make its corrections for the "personal equation" of the observer as much as astronomy now does. He dwelt upon the need of taking account of the internal as well as of the external factors, and emphasized the fact that there is a subjective as well as an objective environment; that the organism co-operates with the surrounding medium in determining the product. From this point of view life is not a war against nature, but merely the interaction of internal and external forces.

Mr. WARD commented upon the views of Herbert Spencer, Mr. Greg, and other authors referred to by Dr. Welling, that the humanitarian and philanthropic enterprises of civilized nations were counteracting the salutary tendencies of natural selection and weakening the powers of the race to cope with its environment. He said that the views of this school had always surprised him, held as

they are by the best reasoners of the age. He considered these altruistic undertakings of modern society as a simple continuation of the process of subduing hostile agencies in nature, in which process alone civilization consists. The present inhabitants of this latitude and climate could not exist here a single year without artificial aids. All the world outside the tropics would be uninhabitable for such an animal as man if he lacked the power to defend and protect himself by artificial devices. But for hostile agencies that prematurely destroy the greater part of all creatures that are born any species would soon overrun the whole globe. Man has done this solely through the control of such agencies. The necessity for charitable institutions arises from the fact that such agencies still continue to be so far unsubjected that a large part of those born would succumb to them for anything which it is in their power to do. Charity means that those who, through social inequalities, have acquired more influence over adverse agencies than they personally need shall exercise that influence in protecting those who have acquired less. This enables these latter to withstand them just as clothing, shelter, &c., enable mankind in general to do so. The same reasoning, therefore, which would do away with benevolent institutions would, if logically carried out, do away with every form of protection that man has ever devised either to prevent the consequences of hostile influences, or to increase the effect of naturally friendly ones in nature. The result of such would be not to remand the race to the condition of savages, but to remand it to that of other animals with the normally circumscribed habits. All this he said was so exceedingly potent to him that it had always been a matter of the greatest astonishment that the views referred to could have been maintained by any rational being, and especially by some of the really deepest thinkers of our time. He could only account for it as a fact from the undue influence which the continued study of natural processes exerts in leading to the belief that they are the only legitimate processes, and that their results must be in some way superior to those of artificial processes. In many scientific minds this admiration for natural methods amounts to a sort of "nature-worship," or physiolatry, which he had sometimes imagined might be a "survival" of this form of religion among savages. It was, he said, easy to show that this belief in the superiority of the methods of nature was not only false, but the exact reverse of the truth, the genetic process being the very least econom-

ical of all processes. Yet, like all preconceptions, such a belief has the effect to blind the best minds to the plainest truths.

Colonel MALLERY mentioned the coincidence that, in a discussion on a trip to Fortress Monroe in the spring of 1881, between Major Powell, President of the Society, Rev. Clay MacCauley, one of its members, and himself, he expressed the result of civilization to be the successful struggle against the law of the survival of the fittest, which view, on returning to Washington, he found presented in nearly the same words by one of the writers quoted by Dr. Welling and published in an English periodical then just received.

FIFTY-NINTH REGULAR MEETING, November 21, 1882.

Colonel GARRICK MALLERY, Vice-President, in the Chair.

The Chair announced that the committee, appointed to confer with similar committees of the Philosophical and Biological Societies relative to the proposed federation of the three societies, had reported to the Council that at the last meeting of the Joint Committee a resolution was adopted declaring that it had been impossible to report any plan that would be acceptable to the three societies, and that the Joint Committee had adjourned *sine die*.

The election of Messrs. John Greene Mills, and John Savary, as active members of the Society, and of Dr. Harrison Wright, as corresponding member, was announced.

The Curator announced that he had received on behalf of the Society the following documents:

From the AUTHOR.—A biographical sketch of Capt. Oliver Brown, an officer of the revolutionary army, who commanded the party which destroyed the statue of *George the Third* in New York city, July 9, 1776. By Rev. Horace Edwin Hayden. Privately printed. Wilkes-Barre, Pa., 1882, 8vo., 22 pp.

From the SOCIETY.—Un agent politique de Charles-Quint, Le bourguignon Claude Bouton, Seigneur de Corberon. * * Par M. E. Beauvois. * * Publication de la Soc. d'Hist. de Beaune, Paris. 1882, 12mo., 229 pp.

From the INSTITUTE.—Third Ann. Rep. Archæological Inst. of America, at Boston. 1882, 56 pp., 8vo.

From the LIBRARY COMPANY.—Bulletin Library Co. of Phila., July, New Series, No. 9, 8vo., pp. 76.

From Isaac St. Goar.—Antiquarischer Katalog, No. 53. Frankfurt-am-Main. 1882.
From Dr. Oscar Löw.—Correspondenz-Blatt der deutschen Gesellschaft für Anth., Eth. u. Urg. July, 1882.
From the Publisher.—The National Scientific Journal, Chicago. Vol. 2, Numbers 1–8, 10.

DISCUSSION.

The discussion of the address of Vice-President Welling was continued from the last meeting.

Dr. Welling stated that he regarded social processes as constituting a modified form of natural selection; that the results brought about by social agencies are due to the interaction of a variety of different influences, no one of which could alone accomplish them; that it is out of this conflicting mass of social activities and interests that the good effects come which we call social progress. He said it was on this view that he explained the common saying that every people has the government it deserves. However low a race may be, the influences, internal and external, acting upon it will necessarily give it the form of government which it is capable of maintaining and which it requires for its own protection. He stated that it was some such train of thought as this that he had intended to follow out in concluding his address, which was accidently interrupted, and that he would take occasion to complete it before publication.

Dr. W. J. Hoffman made some remarks on "The Carson Footprints," which he illustrated with plaster casts of the originals and with drawings.

THE CARSON FOOTPRINTS.

Having occasion to visit the western part of Nevada, a short time since, for the purpose of prosecuting ethnologic investigation among the Washoe Indians living in the immediate vicinity of Carson, my attention was called to the recently discovered footprints in the State prison quarry. Before describing these, it may be well, however, to refer to their geologic position.

One and a half miles east of Carson, in the southeastern portion of Eagle valley, is situated a low sandstone hillock, forming the northern extremity of a low range of hills which project from the Pine Nut Mountains in the south. Upon the northern slope of

this hillock is situated the prison, approximately in latitude 39° 9′ north and longitude 119° 44′ west, at an altitude of nearly 5,000 feet above sea level. The prison yard is formed by the natural floor of sandstone, which has been exposed by quarrying, leaving a natural vertical wall around three sides of the square, varying from fifteen feet in height on the eastern side to thirty-two feet on the western. One reason of this difference in altitude is accounted for from the fact of the dip of the ledge toward the west.

When the quarry was first opened at the original site, a short distance west of the present excavation, large numbers of mammalian bones were unearthed and carried away by people who chanced to visit the locality out of curiosity. During the past summer, however, the attention of the warden was directed to curious depressions upon various portions of the floor of the prison yard, which, upon inspection, appeared to resemble the footprints of a "gigantic human being" so greatly that greater care was exercised in the removal of stone, so as to preserve as carefully as possible any new exposures for the purpose of investigation.

This portion of Nevada was, at a not remote period of geologic time, covered by a system of lakes, and these are generally believed to have been contemporaneous with the glacial period of the Sierra Nevada, and, therefore, of the Quaternary age. If we exclude the consideration of palæontological evidence, this particular formation appears to be Tertiary, which supposition is in harmony with the suggestions of Professors Cope and Marsh, who refer the mammalian remains to the Upper Pliocene.

The formation consists of several strata of fine grayish compact sandstone, one above the other, each having a thickness of from two to five feet, between which are seams of arenaceous shale and clay. In various localities in the compact strata are the remains of branches and roots, some of which are readily removed from the cavities containing them, the branches especially having decreased in caliber before silicification had taken place.

Between the strata, near the upper surface of the formation, bones of various kinds have been discovered almost daily, which were found to be those of deer (*Cervus*), tusks and teeth of the elephant, probably *Elephas primigenius*, and teeth, in excellent preservation, of *Equus major*. The fresh-water shells discovered have been pronounced to be those of the *Anodonta*, and one gasteropod was also noticed, evidently *Physa*.

At the time of my visit the prison floor contained an area of about one and a half acres, and was almost rectangular in form. Upon this floor were the impressions of the hoofs of the horse, deer, and a wading bird of the order of *Grallatores*, numerous tracks of the wolf, possibly *Canis occidentalis*, and of the elephant. The most interesting impressions, over one hundred in number, were distributed over the eastern, southern, and southwestern portions of the yard, and very strikingly simulated those made by a human being upon soft soil.

The entire number of tracks were divisible into six series, and presented impressions of at least two individuals, one being much younger or smaller than the other. The tracks appear to have been made in a layer of sediment of several inches in depth, which covered the harder sandstone immediately below. In each instance there is a ridge all around the indentation, made by the pressure of the foot, varying from one to two and one-half inches in height. This ridge appears to be only partially solidified mud, and is still flaky, and easily broken in recently uncovered impressions.

In the southeastern corner of the yard are a number of confused tracks of the same species, which had been made in deeper mud, the impressions of some exceeding six inches in depth, the heel, in several instances, being deeper than the anterior portion of the foot, as if the individual had struggled or attempted to drag a burden.

All of the footprints are clearly rights and lefts, and deviate from the median line at an angle corresponding to those made by a man. The foot-marks measure nineteen inches in length, about six inches across the broadest part of the heel, and seven inches at the base of the toes. The hollow under the instep is remarkably prominent and characteristic of the human foot, as is also the curvature around the front of the toes. In other words, the impression appears exactly like that made by an Indian's moccasin if pressed upon a layer of thick mud.

No separate indications of toes are visible, and in many of the tracks there is a shallow ridge extending around the edge of the sole as if the foot had been encased in a sandal. In several of the tracks the rounded depressions of the heel, and the ball of the great toe are also visible. The presence of the well defined line corresponding to the cut edge of a piece of hide as a sole gave rise

to numerous speculations with reference to the question of Tertiary man.

The immense size of the tracks is the first objection to any theory to be entertained with respect to man. To meet this objection, an individual was found on the Pacific coast—a Sonoran, if I mistake not—the sole of whose shoe measured eighteen and one-half inches in length, just half an inch less than the largest fossil footprints. Tracings of this foot were exhibited by scientific gentlemen in San Francisco, and I am compelled to admit, that in general outline the proportions corresponded closely to those at Carson.

Another objection relates to the length of stride, straddle, etc. With respect to the former, the distance from heel to heel of the same side averages about four feet and four inches, varying in the regular series of strides from a minimum of three feet ten inches to a maximum of four feet ten inches.

With respect to the straddle, or distance between rights and lefts, there is a variation of from almost nothing to sixteen inches.

I found upon the inner surface of several of the posterior ridges, at places corresponding to the back of the heel, fine lines or grooves intersecting one another irregularly, which presented every appearance of having been produced by bristles upon the animal's foot. These creases had not been artificially produced by cleaning the dirt from the footprints, and they were present in several distinct localities.

No remains of human beings have been found, neither are there any traces of worked implements or weapons, or anything of whatever character which might bear the slightest evidence of human workmanship. The footprints are perfectly flat and squarely set upon the rock; even is this the case where the tracks are deepest and where they were apparently not forced deep enough to strike the substratum of harder formation, as is apparently in all the other impressions. In localities which would have favored the slightest indication of claws no such indications are visible. The layer of mud was of that consistence to receive sharp impressions and to retain them, as is shown in the bird tracks upon which the delicate ridges remain perfect, corresponding to the creases under the claws. The wolf tracks, as well as those of the elephant, also plainly record the form of the ball of the foot and the toes.

That these impressions were made by an Edentate is almost

beyond doubt. A peculiarity in walking, which consists in throwing the weight upon the outer edge of the sole of the foot, survives in the living species of sloths, and it is more than probable that the same was characteristic of the ancient representatives of the genus. A foot of the size indicated by these impressions, would naturally sink to a considerable distance in soft soil, but if arrested by coming in contact with a hard sub-stratum would naturally flatten out the sole, and cause a flat surface upon that substratum. In raising the foot plastic material, such as the present formation appears to have been, would ordinarily adhere to the sole, as many indications of this are visible. The edge around the sides of the foot marking the beginning of the coat of bristles or hair, would also become matted with mud and show a depressed crease, and may perhaps be shown in what was considered the edge of the sole of a sandal. The bristle marks indicated in parts of the inner rim of the footprint would warrant this suggestion. Considering the peculiarity of walking upon the outer portion of the sole of the foot, a rounded elevation would naturally be produced as if there existed a high instep. This elevation is very pronounced in every impression, and clearly points out the characteristic impression of the sloth.

Thus far no remains of any of the *Edentata* have been discovered though it is probable that such will be unearthed.

The casts which I prepared at Carson were taken from the most typical impressions by employing plaster of Paris. The tracks were carefully oiled and a very thin solution of plaster poured over them embracing the ridges, the whole being guarded by first erecting ridges of sand to prevent the plaster from running beyond the proper limits. Casts were also made showing the presence of bristles on the back of the heels, though these were not so satisfactory. More desirable materials for this work could not be obtained at Carson.

Considerable discussion followed, which was participated in by Messrs. Bigelow, Mason, King, Gilbert, Gatschet, and Hoffman.

Prof. Otis T. Mason read a paper entitled "Anthropology at the American Association."*

The discussion of this paper was confined to Prof. Mason's

* Smithsonian An. Rep., 1881, and Naturalist, Sept., 1882.

scheme of terminology, and was participated in by Dr. Fletcher, Messrs. Gatschet and Ward and Prof. Mason.

Sixtieth Regular Meeting, December 5th, 1882.

Dr. Robert Fletcher, Vice-President, in the Chair.

Mr. J. D. McGuire, of Ellicott city, read a paper on "Soapstone Quarries and Aboriginal Tools for Working Soapstone."

The speaker alluded to Paul Schumacher and others who have written upon the subject, correcting some of their errors, especially those that intimate the use of metal. Mr. McGuire has found in the quarries the very implements of stone with which the mineral was worked. A résumé of the principal quarries known was given, with the observation that we know more of the lake-dwellings of Switzerland than of interesting relics lying at our very doors. No perfect vessels have ever been discovered. The process of detaching and finishing the vessels consisted of several distinct steps: 1. Pecking a solid block from the quarry; 2. Shaping the outside by bold chopping; 3. Excavation by pecking. The tools are rude, but eminently adapted to their work. The pits are not deep, and are now filled with the debris of centuries. The vessels vary greatly in size, outline, thickness, handles, &c. The tools are of black granite, and seldom of quartz, which latter Mr. McGuire thinks unfit for the purpose. The tools are picks, mauls, axes, adzes, and celts.

The discussion was participated in by Messrs. Hoffman, Reynolds, and Mason.

Prof. Cyrus Thomas presented a communication on "Mound Explorations in Southern Illinois."

He referred to an enclosure and mounds in Union county, in the southern part of Illinois, on the Mississippi river. Prof. Thomas examined one of the mounds and found it to contain layers of burned clay and sand, and in the centre large masses of charcoal. Further researches were made in Alexander county in an *atelier*, or place for the working of flint. Quarries are in the neighborhood, and an interesting group of slab graves in a mound, arranged in

three consecutive tiers. A ditch was cut through the mound, and thirty to forty graves unearthed, containing fifty skeletons and many implements of wood, bone, stone, and copper. After the descriptive portion of his paper Prof. Thomas went on to draw his deductions from his explorations, comparing them with similar ones made by Professor Putnam, near Nashville, Tennessee.

The distribution of the stone graves was for the first time accurately given, showing the practice to have been very limited in area. Prof. Thomas drew attention to the agreement of distribution in these graves with that of the Shawnees. In closing Prof. Thomas said he was of the opinion that the stone graves show decided marks of European influence.

Mr. REYNOLDS recited his experiences in the Shenandoah Valley, especially with reference to stone graves and the Shawnee Indians.

Remarks were also made by Colonel Seely, Mr. McGuire, and Mr. Holmes.

SIXTY-FIRST REGULAR MEETING, December 19, 1882.

Colonel GARRICK MALLERY, Vice-President, in the Chair.

Dr. ROBERT FLETCHER, Vice-President of the Section of Somatology, delivered the annual address for the Section, choosing for his subject "TATTOOING AMONG CIVILIZED PEOPLE." The address was illustrated by a great number of photographs and drawings.

TATTOOING AMONG CIVILIZED PEOPLE.

The custom of tattooing presents itself from two points of view: the medico-legal and the anthropological. It is with the latter, mainly, that we have to do to-night.

The title of this paper will have indicated that a study of tattooing among savage tribes is not included in its scope. Travelers have described and artists have illustrated the intricate patterns which adorn or disfigure the bodies of the natives of Polynesia or Africa; and the mummied heads of New Zealanders, exhibiting elaborate ornamentation of a high degree of excellence, are common in our museums. If such work be compared with the tattooing of civilized life, the superiority, from an artistic point of view, is generally with the former. The designs which the sailor, the

soldier, and, above all, the criminal, has imprinted on his person, are trivial or offensive in subject and clumsy in execution.

Although the practice of the art is so ancient that we have evidence of its existence in prehistoric times, and that the earliest chronicles of our race contain many references to it, yet the term itself is comparatively modern. It is derived from a Polynesian word, *tattau*, pronounced *tattahou*. Captain Cook, who first introduced the term, printed it *tattow*, making a dissyllable of it, and this erroneous pronunciation has followed the word into nearly every modern language.

It is well to begin with a definition of what is meant by tattooing, and the following, as laid down by Berchon, is guarded and precise: "Tattooing is that strange and very ancient custom which consists in the introduction under the cutaneous epidermis, at different depths, of coloring matter, in order to produce some design which will be of very long duration, though it is not absolutely indelible."

The author quoted, Berchon, was a medical officer of the French navy, who made several reports to his Government on tattooing among sailors and criminals, and, in 1869, published an important book, entitled "Histoire médicale du tatouage."[1] He has assembled an amazing number of extracts from classical writers and from the early fathers, illustrative of the universality as well as the great antiquity of the custom. He begins with a quotation from Leviticus, chapter XIV, which, in the English version, reads thus: "Ye shall not make any cuttings in your flesh for the dead, nor print any marks upon you." Dom Calmet, in commenting upon this passage, says that the Hebrew literally means "a writing of spots." Time will not permit of our following the industrious author's researches, but it is indisputable that, in all ages and almost among all peoples, tattooing has been employed to symbolize love, friendship or sentiment, as an ornament, or as a brand of servitude. An ingenious and *spirituel* application of the process is related by a prolific writer, the Greek physician Ætius. He tells us that two monks who had reproached the Emperor Theophilus with being an iconoclast were imprisoned by his orders and eleven iambic verses of a satirical character were tattooed upon their foreheads.

The methods or processes of tattooing do not differ greatly. In

[1] Histoire médicale du tatouage, par Ernest Berchon. Paris, 1869. 8vo. 182 pp.

civilized life it is performed with ordinary needles, from three to five being either tied together or inserted firmly in a cork or wooden handle. The points are dipped in the coloring matter at each insertion, the skin is made tense as in vaccination, and the needles are generally made to enter at a right angle. The design is often drawn upon the skin beforehand either with a pen or pencil. Sometimes the pattern is pricked out on paper, which is laid on the skin, and finely powdered charcoal being poured over it the desired outline is obtained in that manner. Some tattooers have blocks with needles inserted so as to produce the desired figure at one impression, but this is too painful an operation to be generally endured.

In the caverns of Aurignac, Lartet[2] found some instruments of reindeer horn and of bone, which, from their shape, size, and fine points, led him to believe that they were tattooing implements. In ancient Egyptian tombs similarly-shaped instruments, but of iron as well as of bone, have been discovered, and, from their appearing in pictorial representations also, have been clearly determined to have been used for the purpose named. In Oceanica, at the present time, though needles are easily obtained by the natives, they still employ fish bones, and thorns from plants. Some tribes also make use of a small hammer, generally a stone, by a tap of which the instrument is driven in. Tattooing by incision is also practiced, and in Africa the acrid juice of plants is applied to the skin in regular patterns, so as to produce a raised cicatrix. The coloring matter made use of is Indian ink, charcoal, lampblack, soot, vermilion, red lead, cinnabar, turmeric, gamboge, and, in Polynesia, the powder obtained by burning the nuts of the *Aleurites triloba*.

At the meeting in Algiers, in 1881, of the French Association for the Advancement of Science, Magitot, well known for his ethnographical researches, exhibited a chart showing the geographical distribution of tattooing according to methods. His division was as follows:

1. Tattooing by pricking, the needle being passed straight into the skin at different depths. This method prevailed in the Polynesian Archipelago, excepting New Zealand; in the Marquesas Isles, excepting Rapa, Laivavai; in Easter Island and Micronesia;

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[2] Annales des sciences naturelles. Zoologie. 4e sect. T. xvi.

New Guinea; the Papuan groups, and the Dayall group at Borneo. In South America, the Charruas, the tribes of El gran Chaco of Brazil, the Guaranis, the Pampeans, and the Patagonians. In North America, the redskins. In Africa, the Kabyles, the Arabs, the Egyptians, the Nyam-Nyams, the Senegambians, and the tribes on the banks of the Senegal. In Asia, the Sengli of the isle of Hainan, the Ching-hun ancient races of Corea, the Baitos and the Ouen-chin of Japan, the Koussilis, the Aleutians, the natives of Formosa, the ancient Annamites, and the Ouen-mien-Po, a barbarous people of the southwest of China.

2. Tattooing by simple incision. Practiced in Melanesia, by African tribes at Loango, Makoundé, Mangandja, Machinja, on the east and south banks of Lake Tanganyika, in Guinea, and in New Zealand.

3. Tattooing by ulceration or burning. Practiced by the Huns of Attila; and in Tasmania, Australia, Guiana, by the New Guinea tribes of Papuans, the Mincopies, the Negritos, the Alfouras; in New Caledonia, in the Soudan, in Mozambique, and in Zululand.

4. Hypodermic tattooing, (This consists in passing a needle charged with coloring matter, generally soot, between the epidermis and the true skin in a slanting direction.) Practiced by the Esquimaux, the Tchouktchis, the Greenlanders, and to some extent in Italy.

5. Mixed tattooing. Throughout Europe the combination of pricking and the hypodermic method is employed. In New Zealand, and among some African and Algerian tribes, the process by incision and by pricking are both used. In the Marquesas isles the method by pricking and by ulceration are combined in some cases.

This ethnic distribution by methods is so curious and original that, although not immediately a part of our subject, it needs no apology for its introduction.

A few words must be said upon the question of the indebility of tattoo-marks, although its interest is principally from the medico-legal side, and it is in that connection that numerous experiments have been made. Caspar, of Berlin, was among the first to investigate the subject, and the result of his inquiries was that in thirty-seven cases he found six in which the marks had completely disappeared, while in one case, in which fifty-four years had passed, the design was still perfectly visible. Some time later Hutin, in

France, examining invalid soldiers found 506, out of 3,000, who declared themselves to have been tattooed. A careful examination produced this result:

Very apparent after the lapse of from 4 to 65 years	342
Partly effaced after the lapse of from 10 to 64 years	117
Completely effaced after the lapse of from 28 to 60 years	47
Total	506

Tardieu made some examinations at the hospital La Riboisière; of 92 designs or inscriptions, he found:

57 were very apparent.
21 were partly effaced.
14 had entirely disappeared.

It is not the lapse of time, however, which causes the disappearance of the marks, but the slight depth of the pricking or incision, the nature of the coloring matter, and the frequent friction on the skin which some trades necessitate. If the tattooing be quite superficial, penetrating the epidermis only, it is no unusual thing for it to disappear entirely in a short time. Vermilion and the vegetable blues are much less enduring than black, so that a part of a design is often preserved when the rest of it is entirely gone. Thus, of a soldier, there may be nothing left but helmet, sword, coat, and boots, the face and other parts having faded out completely. Of all colors employed, Indian ink is the most permanent, and if with that pigment, or with charcoal, the punctures have reached the corium, or true skin, the design is almost certain to be indelible. Next to the blacks, indigo is the most staying color. Tattoo marks may be removed by artificial means though they have wonderful power of resistance. Horteloup mentions a case where a red-hot bar of iron fell on a tattooed arm and obliterated a portion of a ship, but even then, with a lens, the white lines completing the rigging could be made out. The application of caustics or of repeated vesication is partially successful, but the resource of the criminal whose tattooed marks have been registered while he was in prison is to alter the pattern by additional tattooing. This can be readily done: an eagle can be changed to a female figure, or an anchor to a serpent. Bertillon records it as the result of his experience that "the cicatrices of tattooing may always be augmented but cannot be diminished."

Some changes of the kind have been closely observed. A horse-shoer who had become a blacksmith adroitly altered a horse-shoe into a forge, adding two figures beating iron upon it. A butcher, changing his occupation, converted a bull's head into an expanded rose. A baker had inscribed the name "Adèle" upon his arm, and when in due course of time she proved faithless, he converted the letters into the well-known cocked hat of Napoleon.

The artifice has the sanction of antiquity. Athenæus relates in book XII of his Deipnosophists that the wives of the Scythians, exulting over the capture of a number of Thracian women, so marked them with points that they had the appearance of being painted. Some years later, the victims of this outrage stained the remaining surface of their bodies in the same manner so as to present the appearance of intentional adornment, and thus did away with the recollection of the stigma.

In the famous Tichborne case the absence of tattooed marks which should have been present formed one of the strongest points against the prisoner. At the age of 17 Roger Tichborne had three symbols tattooed upon his arm; namely, a cross, an anchor, and a heart, indicating Faith, Hope, and Charity. His friend, Lord Bellew, frequently saw these marks, and, himself, tattooed with Indian ink the initials R. C. T., in letters half an inch long, on Tichborne's arm, above the symbols. On the same occasion, with the same needles and ink, Tichborne tattooed an anchor on Lord Bellew's arm. This remained perfectly distinct 25 years later when it was exhibited to the jury. No evidence of tattooing was discoverable on the arm of "the claimant," and he had admitted that he never was tattooed.

Where large bodies of men are thrown together, with much idle time, it is among them that we should expect to find a custom like tattooing most prevalent. Accordingly, it is soldiers, sailors, and, above all, criminals, including prostitutes, who most extensively resort to it.

As regards soldiers and sailors, the love of imitation and a desire to emulate the adornments of their veteran comrades are doubtless the chief motives for the practice. The designs most in vogue with them are such as relate to the glories of their profession, and flags, cannon, ships, patriotic symbols, and amorous devices form the stock in trade of the artist in the barracks or on shipboard.

The criminal classes furnish the most elaborate and the most

curious examples of tattooing. Of late years the study of the criminal from a psychological point of view has been pursued with remarkable results by certain observers. Their investigations have been especially directed to the peculiarities of the brain, and although the study is yet in its infancy it may be predicted that the relations of crime to abnormal conditions of the brain, whether congenital or acquired, will form an important part of the ever expanding science of craniology.

Among the most distinguished of these observers is the professor of medical jurisprudence at Turin, Cesar Lombroso. He is the editor, in conjunction with Garofalo, of a journal entitled, "Archivio di psichiatria,"[3] the full title of which, translated, is "Archives of disorders of the mind, penal science, and criminal anthropology, to aid in the study of insane and criminal man." But his most important work is "L'Uomo deliquente"[4]—"The criminal man in relation to anthropology, jurisprudence, and prison discipline," a work of 740 pages, published in 1878. A chapter in this extremely interesting book is devoted to the subject of tattooing, and from it, and from subsequent papers of Lombroso and others in the journal referred to, are condensed some of the facts and statistics about to be presented to you.

Another writer, whose researches it will be convenient to compare with those of Lombroso, is Dr. A. Lacassagne, a French army surgeon and the professor of medical jurisprudence at the Faculty of Medicine at Lyons. He published, last year, a volume of 116 pages, entitled "Les tatouages, étude anthropologique et médico-légale."[5]

Lombroso's observations were made on 6,784 subjects, of whom rather more than half were soldiers and the remainder criminals, prostitutes, and military prisoners. Of tattooed soldiers, the larger portion were from Lombardy and Piedmont, men of Keltic origin.

Dr. Lacassagne's observations were made in Algeria. There are three battalions in the French army known as *les battaillons d'Afrique*. They are composed of men who have been condemned for desertion, theft, insubordination, and other offenses. At the expi-

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[3] Archivio di psichiatria, scienze penali ed antropologia criminale, etc. Torino.

[4] L'Uomo deliquente in rapporto all' antropologia, giurisprudenza e alle discipline carcerarie. Torino. 1878. 8vo.

[5] Paris. 1881. 8vo.

ration of his sentence the offender is sent to one of these battalions to serve out the time he owes to the state. Dr. Lacassagne went to work very systematically to obtain copies of the tattooing which many of these men exhibited. He laid a piece of tracing-cloth upon the skin and with a pencil copied the design. The cloth, when laid upon white paper, made the drawing appear very clearly, and with red, blue, or black ink, according to the original, he went over the pencil lines. The tracing was finally pasted on a sheet of card-board, on the back of which he wrote the particulars of the case to the number of 20. These details included the name, age, place of birth, and occupation of the subject; the date of the tattooing, its locality, any change which had taken place in it, the method employed, the coloring matter made use of, and so forth. In this way, he obtained 1,333 transcripts of tattooing, taken from 378 persons. The variety and number of designs is especially characteristic of prisoners. It may be laid down as a rule that the more inveterate the criminal the more extensively will he be tattooed.

As regards the region of the body chosen for the operation, Lombroso found the palmar surface of the fore-arm to be most frequently selected. A few were tattooed on the shoulders; some, generally sailors, on the breast. Miners are often tattooed on the fingers, the design being in the shape of a ring. He found no instance of tattooing on the back or on the genitals, except in men who had been in the South Seas, or who were old convicts.

Lacassagne gives the following table showing the parts of the body operated upon in his 378 subjects:

Upon both arms and upon the abdomen	1
the abdomen alone	4
the arms and thighs	6
the breast alone	8
the penis	11
the whole body	29
both arms and upon the breast	45
the left arm only	59
the right arm only	88
both arms	127
	378

Of the designs covering the whole body, one consisted of the complete uniform of a general, another of the complete uniform of

an admiral. Two instances were met with of tattooing on the face. In one, *martyr de la liberté*, and a serpent, had been drawn on the forehead; in the other, the prophetic words *le bagne m'attend*—the galleys await me.

The part of the body selected has often a special relation to the character of the design. Upon the abdomen, below the umbilicus, the emblems or inscriptions were mostly erotic or obscene. In all the eleven cases of tattooing on the penis, a boot, sometimes with a spur on it, was the emblem adopted, and the men acknowledged that the object was to admit of a frightful play upon words, untranslatable, and too vile to be repeated.

The breast is reserved for large compositions, portraits, and even verses.

On the back are sometimes seen some very extensive pieces of tattooing. Lacassagne describes a portrait of the Admiral Jean Bart, which was 37 c. long by 33 c. wide. A Joan of Arc, 41 c. by 39 c. An Abd-el-Kader, 30 c. by 30 c.

Upon the buttocks, obscene designs were mostly found, a common one being a serpent in numerous folds with the head directed to the anus. In another instance, a large eye was drawn on each buttock. In another, two zouaves crossing bayonets and supporting a scroll inscribed *on n'entre pas*. A portrait of Bismarck or of a Prussian soldier was not unusual, the locality indicating a patriotic contempt for the enemies of France.

Sailors who have visited many countries furnish, in some instances, by the marks on their bodies, a chronology of their career; a certain tree indicates a tropical country; a certain color, some particular island; tattooing by incisions, instead of pricking, indicates a visit to New Zealand or to some parts of Africa. Berchon had seen more than 50 men completely covered with designs. Several sailors had a squadron of vessels on the back with the waves of the sea spread over the buttocks. In addition, their chests, arms, and legs were also covered with designs. One sailor carried upon his body the certificates of his constant rebellion against authority. Desertions in all parts of the world had furnished him opportunities to procure almost every fashion of tattooing, and he was covered with a bewildering mass of inscriptions and designs. Among the former was a complete warrant as master-at-arms written in full sized letters across his abdomen.

It is not always at long intervals that the body is covered with

the tattooer's work. In 1859 a soldier, who was being treated for rheumatism in the hospital at Rochefort, nearly fell a victim to his taste for this species of adornment. In July he began with a ring on his middle finger. In August, at one sitting, which lasted three hours and a half, he had a rose and a female bust tattooed on his right fore-arm and a pansy and a bust of his general on the left fore-arm. Shortly after, he had the bust of a Spanish brigand tattooed upon the upper part of his right arm. In the beginning of October he had a final sitting. The artist tattooed upon the upper part of his left arm a figure of Liberty in the Phrygian cap, with a banner in one hand and a drawn sword in the other. Upon his chest were drawn two naked female figures, united by a long garland of flowers, while above them was a winged Cupid, armed with bow and arrows, and also surrounded by a wreath. This allegorical group—which was very skilfully drawn in black and red—was intended to symbolize "conjugal love." Four days later the man entered the surgical ward of the hospital with a grievously inflamed arm; gangrene followed, and amputation at the shoulder-joint became requisite to save the life of the too æsthetic soldier.

Before leaving the subject of the parts of the body chosen for tattooing the statistics may be given of some American cases. In 1877 a tramp named Kelly traveled about the country, chiefly through Pennsylvania, making a business of tattooing. He was saturated with syphilis, and had what are termed mucous patches in his mouth. In performing his operation he moistened the needles and the colors with his saliva, and the consequence was that he inoculated a great many men with syphilis. Dr. F. J. Maury[6] gives the details of 22 of the cases which came under his care. The location of the tattooing in 19 of them was as follows:

On the chest	1
shoulder	1
hand	1
forearm	16

The next division of our subject relates to the character of the designs imprinted by tattooing.

Lombroso divides them into four classes: emblems of love, of religion, of war, of profession. Lacassagne gives the following

[6] Amer. Jour. Med. Sciences. Philad., 1878, N. S. lxxv, pp. 44–62.

details of the 1,333 tracings obtained by him from the battaillon d'Afrique:

Patriotic and religious emblems	91
Professional emblems	98
Inscriptions	111
Military emblems	149
Metaphorical emblems	260
Amorous and erotic emblems	280
Fantastic, historical, and miscellaneous	344
	1,333

Religious designs are more frequent among Italians and Spaniards than among Frenchmen. They consist, for the most part, of a cross surmounting a globe; a heart surrounded with wax tapers; a crucifix; the portrait of a patron saint, or a skull. These designs have generally been produced before the commencement of military life.

Many Italians have been tattooed at Loretta. Around this famous shrine are seen professional tattooers, *marcatori*, who charge from half to three-quarters of a lire for producing a design commemorative of the pilgrim's visit to the shrine of our lady of Loretto. A like profitable industry is pursued at Jerusalem.

Amorous and erotic emblems form, as might be anticipated, a large part of the tattooer's work. Among them are found the name or initials of a mistress, the date of a first love affair, a heart pierced by an arrow and dropping blood, female faces and figures of all varieties, and obscenities which beggar description.

Professional emblems which relate to trades and professions are very numerous, and are frequently of importance in identifying criminals.

Inscriptions are favorite subjects of tattooing. They consist of sentences, proverbs, dates, sentiments; and among criminals frequently of expressions of anger, vengeance, hatred of the law, and defiance of society. The following specimens, translated from various languages, will give a fair idea of their general character: "Death to false women," "Vengeance," "The child of pleasure," "Honor to arms," "Lives alone, for friends are dead," "Hurrah for France and fried potatoes!" "Death to tyrants," "Life is a deception," "Death to French officers." In several instances was found the famous reply of Brennus, but in French, "*Malheur aux vaincus.*"

The propensity of criminals to tattoo sentences of a lugubrious or self-condemnatory character upon their bodies is very remarkable, and furnishes a curious psychological study. The sentence *Né sous mauvaise étoile*—born under an evil star—was tattooed upon the arm of Philippe the strangler of prostitutes, and aided in his conviction. One of his intended victims related at his trial how she had one evening taken a man to her room, but becoming alarmed at his savage looks and at the tattooing on his arm, she contrived to make her escape. It was not the ill-augury of the sentiment of the inscription which frightened her so much as the belief that it indicated an escaped convict. She identified him by face and by tattooing. During the period from 1864 to 1866 over a dozen murders of prostitutes living in their own apartments were committed by this man. The guillotine duly fulfilled the ominous inscription upon his arm. A Venetian convict bore upon his breast these words: *misero me, como dovrò finire!*—wretch that I am, how shall I end! Fieschi, before his attempted regicide, had been condemned for forgery and deprived of his cross of the legion of honor. While in prison, he tattooed the cross upon his breast, with an inscription implying that this one could not be taken from him. Lacassagne three times found the following sentence: "The past has deceived me, the present torments me, the future horrifies me." Other inscriptions of this character are: "The child of misfortune," "No luck," "No chance," "The child of misery born under an evil star," "The galleys await me."

Among Italian or Corsican convicts the vendetta sometimes figures in the designs tattooed upon them, and an oath of vengeance has more than once been found inscribed on the breast of a man condemned for the fulfillment of his vow. Lombroso gives the representation of a Piedmontese who had been a sailor, a robber, and finally a murderer for vendetta. On his right breast was the inscription "*Giuro di vendicarmi*"—I swear to be avenged—with two daggers crossed above and two banners also crossed beneath. A serpent was on the shoulder with its head regarding the inscription. Other designs, not connected with his oath of vengeance, were observed upon him, namely, a serpent, a lion, a female figure, a ship, the name "Maria," and the initials R. P. on his left arm. On the dorsum of the penis were the arms of Savoy and on the gland was tattooed a female face, the meatus forming the mouth!

Another instance is recorded in a recent journal.[7] A criminal who had several tattoo marks upon his arm, fearful of their leading to his identification, so disfigured them with needles as to make them unrecognizable. Shortly after, in a struggle with gendarmes who were arresting him, he received a blow on the head which destroyed one of his eyes. Discarding all thoughts of prudence, he tattooed upon his right arm a vase with the fatal date 1868, and a vow that he would live for 100,000 years to be revenged on the gendarme. He kept the vow and killed the man, the tattooing helping to condemn him.

Beside the inscription of savage vows of vengeance, the Italians make use of tattooing for the purpose of recognition of membership in their secret societies. Lombroso found hieroglyphics and letters on convicts, the meaning of which they obstinately refused to divulge. He is of opinion that the Carbonari were tattooed with an especial mark upon initiation into their dangerous association. You remember how skillfully a modern novelist has made use of this custom in the discomfiture, by its discovery, of that delightful villain Count Fosco, and how the avenger effaced the mark from his arm, after his assassination, and inscribed with his dagger the word "*traditore*"—or traitor—in its place.

A redoubtable convict, Malasséne, a man of herculean strength and size, was covered with inscriptions and designs. On his chest was a guillotine in black and red, with this legend beneath it in red letters, "I began ill, I shall end ill. It is the fate which awaits me."

Among metaphorical emblems are found stars, the star of happiness, the star of misfortune, anchors representing hope, hearts pierced, hands with fingers interlaced indicating friendship, etc. The pansy is the most popular of flowers, being the symbol of remembrance. Of 97 flowers in Lacassagne's collection 89 were pansies. Among fanciful emblems may be named lions, serpents, tigers, dogs, cocks, goats, gazelles, vases, a revolver, the wheel of fortune, and a chamber pot. Mythological personages are seldom met with, being confined to Bacchus, Venus, Cupid, or Apollo. In five instances the portrait was found of D'Artagnan of "Les trois mousquetaires," showing the impression produced on the popular mind by that inimitable romance.

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[7] Archivio di psichiatria. Torino. 1882. III. 156.

The designs produced by the tramp Kelly were quite well drawn, some of them being really elegant. He had a book of patterns from which his customers could select. As very few observations have been made of American tattooing, it will be interesting to quote the descriptions given by Dr. Maury of the 22 men who came under his care in consequence of this syphilitic tattooing. One man had a large crucifixion on his chest; another had a star of 8 rays on his shoulder; another, a star of 10 rays on the hand. On the fore-arms was the greatest variety of designs: a bracelet around each wrist, a crucifixion, a shield with 3 dark and 2 light bars, a dancing-girl on an eagle holding a flag in her hand, an eagle with a scroll surmounted by a crown and 2 letters, a goddess of liberty seated on an eagle bearing the American flag, a figure 2 on which rests a ladder, a naked woman kneeling on a pedestal under a dense weeping willow, and, in several instances, a dancing-girl described as "with crossed ankles," a copy, probably, of the well-known "dancing girl reposing" of Canova.

Probably the most elaborate and extensive tattooing ever seen in Europe or America is that displayed on the person of the Greek, Georgius Constantine. In 1871, this man was exhibited to the class by Hebra, the famous professor of diseases of the skin, at Vienna, and an account of him was given in the Wiener medicinishe Wöchenschrift for 1872.[8] In the atlas to Hebra's great work on dermatology there is an engraving of the head and bust of this man. The story told by Constantine was that he was an Albanian by birth, and that, taking part in the French expedition to Cochin China, he was taken prisoner in Burmah, and with three others was sentenced to be tattooed. One man died under the operation and another became blind. The work upon his body, he says, took three months in the performance. The man's story is, in many respects, incredible; and he seemed desirous of representing himself as a very desperate character. Beside his native language, Greek, he spoke five or six other languages with varying degrees of fluency.

However it was acquired, there is no doubt that the man has been tattooed in the highest style of Burmese art. When exhibited by Hebra, he was about 40 years of age, handsome, and strongly

[8] Vol. XXII, pp. 39-43.

built. From the crown of his head to the points of his toes his skin is entirely covered with figures in dark blue, with occasional intervening designs in red. The interstices between his fingers are covered with small characters in blue and red. Prof. Max Müller says the writing on his hands is Burmese and that the man speaks Arabic and Persian fluently. The blue designs are even seen among his hairs. The only portions of his body not tattooed are the under side of the penis, the scrotum, and the soles of his feet. The total number of figures upon him is 388, which are distributed as follows:

On forehead	2
neck and throat	8
breast	50
back	37
abdomen and buttocks	52
dorsum of penis	1
left arm	51
right arm	50
lower extremities	137
	388

The figures are symmetrically arranged on the two sides of the body. On the breast are two crowned sphynxes, two serpents, two elephants, two swans, and in the middle a horned owl. Among other figures are apes, leopards, tigers, cats, eagles, storks, peacocks, men and women, lions, panthers, crocodiles, salamanders, dragons, fishes, gazelles, fruit, leaves, flowers, and various other objects.

The man exhibited himself in various countries of Europe, and more recently was traveling in this country with Barnum. It is not always that the great showman's curiosities are so well authenticated.

Burmese tattooing has been long known to travelers as wonderfully artistic in design and admirable in execution. Such work as that just described is very costly. An English officer named Chambers paid £40 for a similar piece of work on himself, in which the head was left untouched. One thing that tends to throw discredit on the story of this Greek is the fact that in Burmah criminals are coarsely tattooed across the breast with a sentence declaring their offense. The executioners and jailers have in addition a ring tattooed upon each cheek, and they are known as *Pah-*

quet, ring-cheeked, a term of singular reproach, and detested even by themselves.[9]

It seems most probable that Constantine paid for having this elaborate work performed, and invented the story to give himself a fictitious importance. The newspapers have recently given an account of a young woman in New York city who is undergoing the process of tattooing over nearly the whole body, avowedly to obtain a living by the exhibition.

I am indebted to an American writer, J. W. Palmer, who traveled in the Burman Empire in 1856, for the following account of the adornment of a young noble:[10]

"The tattooing of young Ingaboo was laid on by a master's hand. It was high art even in Burmah where artists in lampblack and fish-galls are held in the highest esteem and extensively fostered by the state. * * * An inch or two above his navel young Ingaboo was encircled with fabulous birds, impossible birds—these were done in vermilion, thirteen birds, and every bird standing on a monkey's head. Thus thirteen blue monkeys girded him round about, just where his *pu'sho* was tucked under at the waistband. A small crimson serpent was coiled about his navel, half within and half without—a cunning device, so expertly done that the little creature seemed just emerging from the hollow. The thirteen blue monkeys grinned on the backs of thirteen blue hogs of Bassien with blushing tails; and after that all were blue and blending one into the other."

In Japan tattooing is mostly confined to the lower classes. They are generally adorned on the shoulders, arms, and thighs, with such figures as are seen on their porcelain. Cinnabar and Indian ink are the pigments employed. The thief who has stolen property not exceeding 60 *bus* in value has a circle tattooed upon his arm. Upon a second offense a man so marked is decapitated.

Some tables have been made of the age at which tattooing is performed. The following from Lacassagne shows the numbers and ages under 21:

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[9] Personal narrative of two years' imprisonment in Burmah, by Henry Gouger, London. 1860. 12°. p. 144.

[10] The Golden Dagon, or up and down the Irrawaddi, being passages of adventure in the Burman Empire, by an American, J. W. Palmer. New York, 1856, 12°, p. 187.

At 6 years	1	At 14 years	8
7 "	3	15 "	9
8 "	1	16 "	11
9 "	4	17 "	8
10 "	4	18 "	10
11 "	5	19 "	3
12 "	7	20 "	5
13 "	3		

As a general rule from 20 to 30 years may be said to be the age when tattooing is most practised. It is sometimes made use of at the very beginning of life. Berchon frequently observed a tattoo mark on infants at the foundling hospitals in Paris, and he learned from the midwives that it was done by them at the request of the mothers for the purpose of enabling them to identify their offspring at some future time. The mark is generally a slight one, placed alongside of a vein to avoid a conspicuous appearance. You will recollect in Beaumarchais' play of "The Marriage of Figaro," that an incident of this kind is introduced, and the foundling who had been tattooed at birth by the attending physician with the professional emblem of a spatula is identified by him at the critical moment.

Tattooing among women in civilized life is almost confined to prostitutes. Occasionally a sailor's mistress or wife may be induced to submit to the inscription of a love token, but it is not common. Parent-Duchatelet, in his classic work on prostitution, states that the women who came under his observation were never tattooed upon parts of the body habitually exposed, or which were easily uncovered in ordinary life, as the arms, but the upper part of the arm or shoulder, the space beneath the breasts, and especially the chest, were the spots chosen. If the girl were young the inscription would be the name of a man, with perhaps "*pour la vie*" added, or the initials merely, "*p. l. v.*" Sometimes the name would be inscribed between two flowers or under two hearts pierced with an arrow. These paragons of fidelity tattoo a new name upon changing their lover. One girl at La Force had thirty names upon her bust. In women more advanced in life the inscription is often found on the abdomen between the umbilicus and the pubes; but it is never a man's that is found there, always a woman's. Parent-Duchatelet observes that the reason for this is obvious when the passion which these women frequently entertain for their own sex is remembered. It is a remarkable fact that in no instance did he

find any obscenity tattooed, the women in that particular presenting a striking contrast to the men with whom they associate.

In Algeria, according to Gillebert D'Hercourt,[11] prostitutes are tattooed upon the face, on the alæ of the nose, on the forehead, chin, lower lip, arms and wrists. Sometimes the back of the hand is covered with a lace-work pattern in the shape of a mitten. When a woman of this class quarrels with her lover, she applies a burning cigarette to his name on her arm or chest. Lacassagne saw many cicatrices of burns produced in this manner. Tattooing as a love-token is not a recent custom with them. Purchas, in his Pilgrimage, published in 1613, says: "The Egyptian Moores, both men and women, brand their armes for love of each other." Moorish women are the professional tattooers among the Arabs, and stand in the market place to offer their services.

Before concluding this sketch of tattooing it is necessary to say something of the occasional accidents arising from the practice, and also of its use in surgery.

The operation of tattooing, simple as it may appear, is not unfrequently attended by severe inflammation, erysipelas, gangrene, and even death. In 1860 the French minister of marine issued an order forbidding the practice of tattooing in the navy on account of the danger attending it, some men having lost their arms, and some their lives.

In 1862 Dr. Berchon made a report to the Academy of Sciences, in which he gave the details of forty-three cases of accidents from tattooing; eight in which death resulted either directly or indirectly; eight in which amputation was performed, viz: one of a finger, one at the wrist, four of the arm, one at the shoulder, and one of a thigh; seven cases in which gangrene occurred, in two of them extending over an entire limb; twenty-five characterized by inflammation, requiring at least a month's treatment, and one unique case of arterio-venous aneurism at the bend of the elbow. I have met with another case, however, of this latter injury, produced by the same causes, in a recent German medical journal.

Lieut. Colonel Woodthorpe, in a paper describing the tribes of the Naga Hills, recently read before the Anthropological Institute of Great Britain, says:

"The operation of tattooing is sometimes attended with fatal

[11] Anthropologie d'Algérie. Mém. Soc. d'Anthropol. de Paris, III, 17.

results. I was once asked to visit a poor little girl about 10 years old, whose legs had been tattooed a few days before. The operation had resulted in inflammation and mortification of the limbs. I went into the house where the poor little thing—sad votary of fashion—lay screaming with pain. The sores were dreadful, both legs apparently rotting away below the knee. * * * Fashion, whether in tight lacing or tattooing, claims its victims all over the world."[12]

Of the danger of accidental inoculation of syphilis from tattooing, a striking instance has already been given in the account of the twenty-two men who were operated upon by the tramp Kelly. Of these men four had never had syphilis, but escaped untainted; three of them had had syphilis before, and their cases may be considered doubtful; fifteen had never had the disease, and were all infected by the tattooing. Simonet, in the Progrès Médical[13] for 1877, describes eight cases of syphilis produced by the saliva of a tattooer.

In a quite recent number of the British Medical Journal (1882, II, 632) is an account of the case of a young soldier of the Scots guard, the finest man physically in the regiment, being 6 feet 4 inches high, and most symmetrically formed; upon a tattooed figure upon his forearm chancres were developed, followed by the usual train of constitutional symptoms.

An unintentional case of tattooing occurred not long since. A gardener fell from his ladder and severely excoriated one side of his nose on the gravel. He was working with charcoal that day, and from time to time rubbed the aggrieved member with his blackened fingers, until the result was a beautiful piece of ineradicable tattooing on the side of his nose.

Finally, tattooing is to be ranked among the resources of the surgeon. In certain diseases of the eye a white spot is formed on the cornea, and is unpleasantly conspicuous. The oculist, by adroitly tattooing it with an appropriate color, materially lessens the disfigurement.

A similar treatment has been successfully applied to *nævus*, a congenital erectile tumor known as "mother-mark," and in a

[12] Notes on the wild tribes inhabiting the so-called Naga Hills on our north-east frontier of India. Lieut. Col. R. G. Woodthorpe, R. E. Jour. Anthrop. Inst. Lond., 1882, xi., 196–214.

[13] 1877, v., 205.

simpler form as "port-wine stain," the color of which being much darker than the surrounding skin, is susceptible of considerable improvement by tattooing. An ingenious piece of work of this description was performed by a non-professional operator. A sailor had a large congenital red stain on his breast, which a tattooer converted into a figure of liberty waving the tri-color. The artist left enough of the original red to form the Phrygian cap, the robe of the goddess and the red part of the flag, and so adroitly added the other necessary colors as to entirely disguise the primitive mark and to present a very handsome specimen of tattooing.

In certain cases where disease or injury has destroyed portions of the face and left the teeth uncovered, the ghastly disfigurement can be remedied by making artifical lips with flaps cut from the cheeks or other parts of the face, but the edges of the mouth so formed are of course of a livid, unnatural color. By tattooing with a red pigment Dr. Schuh, of Vienna, has succeeded in producing quite respectable though scarcely rosy lips.

A French army surgeon has proposed to employ tattooing as an adjunct in the treatment of hemorrhage from wounds in battle. In most of the continental armies systematic attempts have been made to instruct the common soldier how to act in certain emergencies of his profession. Manuals have been written for him, and in the German army a handkerchief is issued on which are printed illustrations of bandaging, of applying improvised tourniquets and of the method of carrying the wounded. The surgeon in question, M. Comte, taught the men how to compress the brachial artery with their fingers, so that pulsation would entirely cease at the wrist. In like manner they were shown how to compress the femoral artery and the carotid. The men became greatly interested, but it was evidently of the first importance that they should know where to apply this digital pressure, and they readily consented to allow the surgeon to tattoo a broad line on the precise location in each man's limb at which the artery could be most effectually compressed. An experiment was made to test the quickness with which the proceeding could be conducted. A soldier fully equipped and accoutred was supposed to receive a gun-shot wound of the leg. In one minute's time his comrades had relieved him of his arms, extended him on the ground, removed his clothing and compressed the femoral artery on the tattooed spot, so that all pulsation ceased beneath it. Of course an experiment on the parade ground is very

different from practice on the field of battle, but it is probable that the proposed arteriography, as M. Comte calls it, might save a percentage of lives.[14]

In connection with the medical use of tattooing a curious bit of history may be told. During the late civil war the professional bounty-jumper became as dangerous a foe to the Government as the armed enemy. He was taught most adroitly to conceal his disabilities, and if rejected at one recruiting depot, he would present himself at another, succeed in being enrolled, pocket the enormous bounty, and desert, to renew the proceeding. To aid in detecting these men the examining surgeons were directed to make a certain mark over the loins with nitrate of silver. This would remain for some days, and served to warn the next medical officer. The plan worked admirably until a woman discovered the mark upon her husband, and the explosion came. The newspapers teemed with indignant exclamations at the outrage inflicted upon free-born Americans by branding them like cattle, and the harmless device was necessarily abandoned. The noble citizens whose sensibilities were thus wounded, robbed the Government of many millions; one of them acknowledged that he had enlisted and deserted thirty-two times.

And, now, what can we say as to the causes of the prevalence of this singular custom of tattooing?

Lombroso regards it, as above, all due to atavism. There is some confusion in the use of this term; even Topinard seems to confound it with heredity when speaking of the Austrian lip and Bourbon nose. Atavism is in one sense heredity, it is true, but it is properly used to express a *recurrence* to a type derived from some more or less remote ancestor. The term itself is objectionable as lacking in precision, and the expression "atavic inheritance" as distinct from "continuous inheritance" is to be preferred. It does not seem that a decorative art like tattooing could be derived from recurrence, but that it is rather the result of imitation and tradition. Darwin suggests another reason. After speaking of tattooing and similar customs, he says:

"It is extremely improbable that these practices, which are fol-

[14] De l'hémostase temporaire dans les blessures de guerre. De l'artériographie ou application du tatouage à la chirurgie d'armée, par J. Comte. (Paris these,) Paris, 1880, 4°.

lowed by so many distinct nations, are due to tradition from any common source. They rather indicate the close similarity of the mind of man, to whatever race he may belong, in the same manner as the almost universal habits of dancing, masquerading, and making rude pictures." [15]

In 1856, Father Garucci published a work entitled "Grafitti de Pompei." [16] A proverb, common to many languages, says that "walls are fools' writing paper." The walls of the houses in Pompeii abound in stylus pictures and inscriptions, a great many of which are copied in the work of Garucci. Lacassagne points out the striking resemblance between the *grafitti*, or picture-writings, and the general style of design of the tattooers. Take one example: Garucci prints an emblem consisting of a heart with the name Ψυχή inscribed in it, which he interprets to mean "Psyche is my heart, or in my heart." Lacassagne has more than thirty designs in his collection exhibiting the same thought as this *grafitto*. In other respects a similarity is to be observed; both tattooing and picture-writing are ideographic, expressing a thought by an image or a symbol. Some of these designs are phonetic, and rebuses are common to them both.

It has frequently been asserted that there is an analogy between the adornments of tattooing and heraldic bearings. This is true to some extent in savage life. Captain Burton, speaking of Abbeokuta, says, "Every tribe, sub-tribe, and even family, has its blazon, whose infinite diversification may be compared with the lines and ordinaries of European heraldry." [17] Father Mathias G. says that in Oceania every royal or princely family has a family of tattooers especially devoted to their service, and that none other can be permitted to produce the necessary adornment.

Gillebert D'Hercourt,[18] on the other hand, says that among Arabs and Kabyles tattooing cannot be regarded as a sign distinctive of religious or political sects or as a tribal badge. Formerly the great Arab families tattooed their slaves with an uniform mark for identification and as a badge of ownership, but the custom is dying out.

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[15] Descent of Man. New York. 1871. II. 327.

[16] Grafitti de Pompei, transcriptions et gravures traceés au stylet; recueillies et interpréteés par Raphael Garucci. 2e édit. Atlas de 32 pl. Paris. 1856.

[17] Abbeokuta. I. 104.

[18] Etudes anthropologiques sur 76 indigènes de l'Algérie, par le dr. Gillebert D'Hercourt. Mem. de la Soc. d'anthropologie de Paris. III. 1868–1872.

The cross imprinted on the forehead by the Kabyles, and which was once supposed to indicate their Christian origin, is equally worn by the Mahometan tribes of the south, and is purely ornamental. Mothers tattoo their children from taste or caprice, and very frequently with the same patterns they use in their embroidery. A Moorish woman in reply to the question said, "It is done for beauty, it is an ornament, a flower."

If the inquiry as to the origin of the custom be addressed to aboriginal tribes there is no satisfactory knowledge to be obtained. The legends which pretend to account for it are generally childish or absurd. Tylor refers to this view in his "Primitive Culture." He says, "Of the legends of tattooing, one of the oddest is that told to account for the fact that while the Fijians tattoo only the women, their neighbors, the Tongans, tattoo only the men. It is related that a Tongan on his way from Fiji to report to his countrymen the proper custom to observe, went on his way repeating the rule he had carefully learnt by heart, "Tattoo the women but not the men," but unluckily he tripped over a stump, got his lesson wrong, and reached Tonga repeating, "Tattoo the men but not the women;" an ordinance which they observed ever after.[19] Such *ex post facto* legends are very unsatisfactory and lead us to agree with Tylor's conclusion that "though it may be consistent with the notions of savages to relate such explanatory legends, it is not consistent with our nations to believe them." It may be added that the most embarrassing cases of explanatory tradition are those which are neither impossible enough to condemn, nor probable enough to receive.

Another tattooing legend is told by Latham.[20] He says, "Does any one believe this, namely, that one of the forms of tribute to one of the conquerors of one the branches of the Khyens [a race in Aracan] was the payment of a certain number of beautiful women? To avoid this, the beautiful women tattooed themselves so as to become ugly. This is why they are tattooed at the present time. So runs the tale. In reality they are tattooed because they are savages. The narrative about the conqueror is their way of explaining it."

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[19] Primitive Culture, by E. B. Tylor. 2v. 8vo. London. 1871. i. 355.

[20] Descriptive Ethnology, by R. G. Latham. 2v. 8vo. London. 1859. I. 152.

The obverse of the legend occurred in Burman. A handsome woman of rank was discovered in an intrigue with a young man of low birth. She was tattooed in the face in order to punish her by the destruction of her beauty.[21]

It has been asserted that tattooing was adopted to conceal the nakedness of the body, and in that manner to take the place of clothing. There seems to be no foundation for the belief. Certainly modesty was absolutely unknown to the tattooed natives of Otaheite, as described by Captain Cook and Sir Joseph Banks. The distinguished anthropologist, Miklucho-Maclay, in a recent communication to the Society of Ethnology of Berlin, describing the natives of the archipelago of Pelan, states that the women all have the mons Veneris tattooed. The hair is removed by evulsion before the operation is performed. Miklucho-Maclay frequently asked young girls to lift up their "kerint," a sort of petticoat of leaves which they wore, and to show him their tattooing. They readily complied, seeming to have no feeling of shame or modesty in rĕlation to the matter. The appearance, he adds, was that of a triangular piece of blue stuff;[22] and a plate of it duly appears in the Verhandlungen of the Society.

Chief Engineer Melville informs me that the tribe of Tungoos which he had the good fortune to meet soon after landing at the mouth of the Lena were entirely unacquainted with the practice of tattooing, and evinced the most unbounded astonishment at the tattooed designs on the arms of some of his sailors who had stripped for ablution. They were curious to know how it was done, and perhaps some future generation of Tungoos may have a legend to tell as to the origin of tattooing in their tribe, in which that gallant officer may play a part.

Whatever may have been the causes which produced the custom of tattooing among savage races, its adoption and the perpetuation of its use among civilized man must be accounted for by other motives. These may be summarily stated as follows:

1. Vanity. A childish delight in the display of an ornament; the pleasure of being thought singular and original.

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[21] Gouger, *op. cit.*, p. 201.

[22] Anthropologische Notizen, gesammelt auf siner Reise in West-Mikronesieu und Nord-Melanesien im Jahre, 1876. Verhannl d. Berl. Gesellsch. f. Anthrop. Ethnol., und Urgeschichte. Berl. 1878. x. 107., 1 pl.

2. Imitation. This is, perhaps, the most prolific cause. A soldier who was rallied for his tattooed designs, replied, "We are like sheep; we can't see anything done by a comrade without imitating it, even though it hurt us."

3. Idleness; and to it must be attributed the prevalence of the custom among soldiers, sailors, criminals, and prostitutes.

4. Religion has some influence from its tendency to preserve ancient customs. At Loretto and Jerusalem tattooing is almost a sacred observance. Of 102 tattood Italian criminals, 31 had religious emblems.

5. The passions, both noble and ignominious. Friendship, family affection, love, lust, hatred, and revenge, all find expression by this device. Dr. Albertotti describes what he calls an epidemic of tattooing.[23] Twelve young men of excellent families, upon leaving the College of Castellamonte, tattooed each other's arms with a symbol relating to their student days; in most instances with the name of a professor or a comrade. It must be observed that, although most prevalent among the lower classes, tattooing is by no means confined to the ignorant or debased. It is not long since the English papers rather indignantly commented upon a statement in the *Revue des deux mondes* that the Prince of Wales, when at Jerusalem, had permitted an anchor to be tattooed upon his arm.[24] Of the 378 men observed by Lacassagne 299 could read and write.

6. Heredity. While dissenting from Lombroso's theory of atavism, it seems probable that symbols of trades and occupations, devices from flags or seals, and perhaps heraldic bearings, have been handed down by tattooing through many generations.

Lastly, a feeling of *esprit de corps*, which, among soldiers, sailors, and members of secret societies, would lead to the adoption of a characteristic badge, must not be omitted from the category of motives.

The custom cannot be said to be dying out. On the contrary, it prevails as much as ever, and so widespread and deep-rooted is the taste for this barbarous adornment, even in civilized life, that we

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[23] L'Uomo delinquente, p. 83.

[24] Revue des deux Mondes. 1881, 15 Juin. Voyage en Syrie, par Gabriel Charmy.

must perforce assign to tattooing a permanent though lowly place in the division of technology, which includes the decorative arts.

Nearly 250 years ago a curious book appeared, which is now very scarce, entitled, Anthropometamorphosis: Man transform'd, or the artificial Changeling, by John Bulwer.[25] It is a description of the various methods of adorning or disfiguring the different parts of the body in different countries, and, in some homely rhymes, he thus expresses his indignation at the custom of tattooing:

There Art with her bold stigmatizing hand
Doth streaks and markes upon their visage brand.
The *Painter-stainers* here assume a place,
From whence descended our face-taking race;
Their faces red and white, blacke, yellow, bleu,
Distain'd, all sorts of an imposed hue.

* * * * * * *

Painted with lists here, naked arms behold,
Branded and sounced with colors manifold.

* * * * * * *

About their legs strange lists they there doe make,
Pricking the same with needles, then they take
Indeliable tincture; which rubbed in
The gallants doe account the bravest gin.

* * * * * * *

Thus cap a peia is that gallant great,
Horrid transformed self-made man compleat.
Admitted for to see each ranged file,
Can indignation give you leave to smile?

DISCUSSION.

Prof. MASON inquired whether the symbols employed in sign language were ever found tattooed upon the body.

Dr. FLETCHER thought not, but said that messages and other forms of recognition were of frequent occurrence.

Col. MALLERY said he understood that in Burmah tattooing was held to be a test of courage, but, if females as well as males were tattooed there, this seemed unfavorable to that view.

Dr. FLETCHER spoke of the great endurance displayed by the women of savage tribes in submitting to the operation, and said

[25] Anthropometamorphosis: Man transform'd, or the artificial Changeling, by J. B. London. Sq. 8vo. 1653.

that disgrace and often chastisement followed any disposition to complain. It was considered a sort of ordeal.

Col. SEELY, Examiner in the Patent Office, referred to the ease with which tattooing might be imitated. He said that inquiries had been made at the Patent Office by the agents who were interested in the case of the New York woman who was undergoing the process, whether a patent could be obtained which should prevent imposture by counterfeiting it.

Dr. HOFFMAN remarked that the Serrano Indians of southern California formerly practiced tattooing, the designs upon the cheeks and chin being also drawn or incised upon trees or posts which marked the boundaries of the individual possessions. These facial designs were known to the several members of the tribe, and when found, as stated, upon boundary posts they were at once recognized and the claim respected. The custom was still in vogue in 1843. In the northern part of California the women only tattoo, with the exception of a single tribe. The custom is said to have originated in the necessity of having some means of identifying captives taken during war, as the mixture of languages resulting from constant intercommunication created confusion, and language would not be sufficient evidence on account of frequent similarities, either by being of the same linguistic stock, by adoption of another, or by the incorporation of foreign words. Hence, the tattooed lines adopted by the women are in reality marks of tribal distinction, and a particular style will be found stereotyped among the female members of any given tribe. The Mattoal was the only tribe of that State in which the men tattooed. They adopted a mark of tribal designation, which consisted of a single round blue spot in the middle of the forehead. The Klamath Indians, of Oregon, had a single line of black running down over the middle of the chin. The women had three lines, one from each corner of the mouth and one from the centre of the lower lip, reaching down to the end of the chin. Half-breed girls had but one, vertical in the middle of the chin. The material used consists, generally, of root or finely powdered charcoal. Pricking is produced by means of a sharply pointed piece of bone, thorns, fish spines, and, more recently, needles.

Other tribes were also mentioned where painting had taken the place of tattooing; and in conclusion the speaker stated that the man Kelly, who had inoculated many persons with syphilis while

tattooing them, had been examined by him, and a considerable number of patients had also been under his treatment at the time, in Pennsylvania.

Mr. COOMBS said that the practice of tattooing by civilized races was very ancient, and that Herodotus speaks of it in his histories.

Mr. REYNOLDS said that while Dr. Fletcher's paper was devoted to modern, "civilized" tattooing, he would refer to the same practice among the ancient Britons, mentioned by Cæsar, Pliny, and Herodian. These writers relate that the Britons stained their bodies with *woad*, to give them a blue color, and that they were in the habit of drawing upon their naked bodies the figures of animals of all kinds, which they esteemed so great an ornament that they wore no clothes, in order that the figures thus delineated might be exposed to view.

This mode of picture-making was considered a distinct and highly honorable art among the savages of the British Isles. Persons of inferior rank had but few of these figures, of coarse workmanship, painted on their bodies; while those of better families had them in greater numbers, of more elaborate dimensions, and more elegantly executed, according to their different degrees of nobility. Isidorus, in commenting on the inhabitants of the southern part of the Island, says "The name of the Picts corresponds very well with the appearance of their bodies; for they squeeze the juice of certain herbs into figures made on their bodies with the points of needles, and so carry their badges of nobility on their spotted skins."

The speaker alluded to the many hundreds of cases of tattooing as practiced in the American and British navies. The most prevalent designs in the former service are crosses, hearts, a nude Venus rising from the calyx of a lily, banners, stars, masonic emblems, and anchors. Sentimental mottoes are of common occurrence.

The tattooing sometimes requires weeks to finish—especially in large or intricate subjects, is always followed by swelling, and sometimes a limb is lost and even life itself is jeopardized. The art is confined principally to the forearm and wrist, although cases had met the speaker's observation where the entire posterior part of the body had been subjected to this painful process.

Among the most elaborate designs which he had noticed, or heard of, was that of a hemisphere covering the back and shoulders of a sailor, which led to his being called by the somewhat appropriate

name of "Atlas." Another sailor—a Scotchman—had his legs tattooed in colors to represent the tartan hose of his clan. A third case, was seen at Gibraltar, where an old British man-of-wars-man had the battle of Trafalgar tattooed on his back. The English fleet was depicted on the right side of the spine and extended from the posterior crest of the ilium to the scapula; the contending fleet being ranged along in a similar manner on the opposite side of the vertebræ. Another remarkable but morbid case, was where a sodded grave was finely tattooed on the buttocks of a sailor; a weeping willow drooped limply over the grave, while on a tombstone at its head were recorded the epitaph and many virtues of the still-living "deceased."

The speaker had heard that blistering or scarifying the tattooed parts and then washing with warm milk, would cause the colors to disappear. He also alluded to the galley slaves whom he had seen in the "Murion" and "Belle-Poule," at Toulon, south France. He had heard that it was the former practice of the government to tattoo certain parts of the galley slaves' bodies in order to identify them, in case they should escape from the ships or from the penal colony in New Caledonia.

In the British army it was formerly the custom to brand deserters in the back with a hot iron, by which the letter "D" was indelibly formed. To hide this stigma, the persons thus branded resorted to elaborate tattooed figures which effectually concealed the injured part.

SIXTY-SECOND REGULAR MEETING, January 2, 1883.

Major J. W. POWELL, President, in the Chair.

Capt. C. E. DUTTON made a verbal communication on THE HAWAIIANS, of which no abstract has been furnished the Secretary.

Numerous inquiries from Prof. Mason, Prof. Goode, Mr. Coombs, and other members were satisfactorily answered by the speaker, further illustrating his subject.

SIXTY-THIRD REGULAR AND FIFTH ANNUAL MEETING, January 16th, 1883.

Major J. W. POWELL, President, in the Chair.

The election of Mr. E. P. Burgess, teacher in the High Schools

of this city, Mr. Albert Niblack, midshipman U. S. N., on duty at the National Museum, and Mr. J. King Goodrich, of the National Museum, to active membership, was announced.

The Treasurer made his report for the year.

The Society then proceeded to a ballot for officers, of which the following is the result:

President	GARRICK MALLERY.
Vice President—Section A	ROBERT FLETCHER.
" B	J. C. WELLING.
" C	J. W. POWELL.
" D	OTIS T. MASON.
General Secretary	W. J. HOFFMAN.
Secretary to the Council	F. A. SEELY.
Treasurer	J. HOWARD GORE.
Curator	C. C. ROYCE.
Council at Large	G. K GILBERT. A. F. A. KING. H. W. HENSHAW. EDWARD ALLEN FAY. LESTER F. WARD. DAVID HUTCHESON.

The amendments which had been duly proposed to the Constitution were then taken up and acted upon.

The one proposed by Mr. Ward relative to times of holding meetings as provided in Article XIII was discussed and finally laid on the table.

That proposed by Prof. Mason relative to fees and dues as provided in Article XV, was also discussed at length, amended, and finally adopted in the following form:

For the first clause of Article XV substitute these words—

"The admission fee shall be five dollars, which shall exempt the member from the payment of dues during the year in which he is elected. The annual dues thereafter shall be three dollars, to be paid prior to the election in January."

Sixty-Fourth Regular Meeting, February 6th, 1883.

Prof. Otis T. Mason, Vice President, in the Chair.

On motion it was resolved that the reading of the papers, assigned for this evening, be postponed until the next regular meeting.

SIXTY-FIFTH REGULAR MEETING, February 20th, 1883.

Colonel GARRICK MALLERY, President, in the Chair.

The election of Gen. William Birney, Dr. George M. Acker, Mr. John H. Renshawe, and Dr. John Hamilton Porter, as active members, was reported.

Col. F. A. SEELY read the following paper entitled, "AN INQUIRY INTO THE ORIGIN OF INVENTION:"

The industries of the present day, with their machinery, appliances, and products, have not escaped that inquiry into their origin which man gives to everything that is prominent in his physical or intellectual horizon. In investigating the origin of many mechanic arts and expedients research has been well nigh exhausted. The plough, the forge, the loom have been traced back to rude originals, sometimes antedating the historic period, and the account of their growth forms no small part of the history of civilization.

But with all the attention that has been paid to particular arts, processes, and mechanical appliances, it is noticeable that invention itself, the faculty through which man has wrought out his multitudinous contrivances, has scarcely attracted attention to its history. And yet, neither as a curious problem in itself, nor in its bearings on the history of the human race, does it seem unprofitable to inquire: What were the first steps by which man became an inventor? Out of what germs did he derive his first mechanical ideas? Were they original with him or borrowed? If derived from some other source, what was it? And what were the first improvements which may justly be regarded as inventions?

These questions are very different from inquiries into the origin of the steam engine, the growth of a couple of centuries; or of metal working, which does not reach far beyond the historic period; or of the loom, which cannot be as old as the use of skins for clothing. They reach back to an antiquity to which the earliest historic date is as yesterday. History barely skims the surface of these remote depths. As far back as she takes us, we find men living in the midst of mechanical appliances not widely different from to-day's. Wood and metal and stone were wrought, sometimes with effects which are the despair of our artisans, agriculture in its highest perfection was carried on, textile industries were highly developed, and the so-called mechanical powers, which constitute

the elements of all our labor-saving machinery, were practically as well known as they are now.

It is equally idle to question archæology. She can guide us no further than, groping in caverns or delving in alluvium, she finds evidence of man's existence in bits of imperishable flint or charcoal; but she cannot tell us at what period of his progress he began to work the refractory flint, or found use for fire in the preparation of his food.

If we question mythology, we find no more satisfactory answer in her dim traditions and dreamy personifications of natural phenomena. She may ascribe to Osiris and Apollo the invention of the plough and the lyre, but cannot tell us when or where these personages lived, nor anything of man's vast and varied history before he attained the social condition which favored the cultivation of music, or had so far succeeded in domesticating beasts of burden that the use of the plough was possible. The mythologies reach no further than a stage of organized society. The arts at whose origin they hint are the arts of a people on a high plane of civilization.

To consider the nature of the first steps in mechanical invention, far back of history, of tradition, and of the revelations of archæological research, is the object of this paper.

In this inquiry there would at first seem to be a field for boundless conjecture, and for little certainty; but I am convinced that the subject need not be wholly left to conjecture. In all arts, the history of their progress is a history of elaboration, of successive steps, or accretions. It is by the superimposition of one slight improvement upon another, that, within the period of recorded history, they have been perfected, and we may read their history as we may count the courses in a monument, from the foundation upward, or from the capstone downward; and the process by which the monument has reached its height is as clearly legible read from the top as from the bottom. It is in this way that men whose business is with the study of inventions read their history. They pass backward from the perfected machine or product, eliminating in reverse order the successive improvements that have been made, and so arriving at successively simpler and ruder forms until the original germ is reached. It is otherwise in books. In them we trace forwards the gradual growth, for instance, of the steam engine, from the toy of Hero of Alexandria, through the crude experiments of the 17th century, the pumping machines of Papin

and Savary and their contemporaries, Humphrey Potter's shrewd contrivance to relieve himself of shifting the valves, Watt's complete engine, and so on, step by step, one slight improvement upon another, until we reach the mighty engines of our own time. We cannot conveniently nor logically write history except in this direct order; but in our own minds, in scanning the history of an art, we always trace it backwards, just as the traveler looks back over the route he has passed. We separate from the perfected engine its latest improvements, always going back to less perfect forms, until we reach the clumsy pumping machine with an impatient boy pulling the valve-strings with one hand and rattling the marbles in his pocket with the other, cogitating how he can make the machine actuate its own valves while he disports himself more to his satisfaction. The valve movement removed, we next eliminate the cold water jet in the cylinder for condensation, then condensation by cold water outside the cylinder, and we have reached the stage where the steam engine is represented by a philosophical apparatus in which the energy of steam is exerted upon a piston, but with no adaptation to any practical purpose. Here is the beginning of the steam engine proper, since back of this we find nothing but speculative experiments to demonstrate the existence of energy, but with no practical notion of its utilization.

But if this is the beginning of the steam engine proper, there is in it, and fundamental to it, a mechanical appliance, without which it could never have been devised, and the origin of which we are apparently as far from as when we began. I mean the cylinder and piston common to the engine and the ordinary pump. Where this contrivance originated would be an interesting subject for special research, the lift pump in which it is so familiar to us being unknown to the ancients.* In the cylindrical bellows of China and Madagascar, however, we find an apparatus embodying these elements, probably well known in Europe during the Middle Ages. This was, no doubt, a modification of some earlier form of the bel-

* It seems probable that the idea of the force pump was familiar to the ancients. Machines constructed by Hero of Alexandria (100 B. C.) and Ctesibius (130 B. C.) are thought to have been double cylinder force pumps, lacking only the air chamber of being practical fire-engines, equal to any in use a century ago. (See *Das Feuer*, by Dr. Gustav Lindner, Brünn, 1881.) It is hard to refrain from fancying how the world's history might have been affected if Hero, in his experiments with steam, had thought of applying it to his piston and cylinder.

lows, more like that familiar to us. But whence came the bellows? We may reasonably presume that this rather complicated structure was elaborated from a ruder form, originating in the use of inflated skins or bladders with nozzles of reed, used in the primitive metallurgic processes of our remote ancestors. Can we go a step further? We have left only the human lips and lungs with the possible assistance of a tube of reed. Here the backward journey ends, for we have reached the limit, the possession of man in a state of nature, before any step in invention had been taken.

This process of reading the history of a machine or art, which may be called elimination, is strictly evolution read backwards. Although in passing out of the field of recorded history we work in the dark, yet, by means of this process, we work with all the certainty with which we read the geological history of the earth by boring downward through the successive strata. It is true we may err, as the geologist finds faults which, for the time, mislead or deceive him; but no doubts trouble him as to the essential truth of his science or the certainty of the results he compiles from many observations. And so, if we take up any art or machine and trace its history in this way, we may not always follow exactly the actual routes they have taken to reach their present perfection; but we shall surely, by eliminating at each step that which is clearly an improvement or modification of some earlier form, arrive ultimately at as rude mechanical expedients as the remote germ out of which the idea of the steam engine appears to have sprung. And we may be certain that in the contemplation of any structure, however rude, we have not reached its ultimate origin so long as it shows a trace of improvement upon a ruder form or an earlier art.

Let us apply the process of elimination to an instrument quite simple, but complex enough to be the outcome of many successive improvements, the bow and arrow of a savage. I will not describe the bow, but the arrow is of wood or reed. It is pointed with metal, flint, or bone, and the point, which is barbed, is bound in place by strips of sinew. The butt is notched and feathered, sometimes with three feathers set on spirally. If we knew nothing of the history of this instrument, we could read in its structure that it was the result of growth, that human ingenuity never at once could have originated it as perfected, but that the details mentioned point to long ages of experience and successive improvements. We cannot tell, in all respects, in what order these improvements

have been made; but we are safe in saying that the arrow, in the form of a dart or light lance, must have antedated the bow, while some of its peculiar features, such as the spiral feathering, most probably were added to it since the invention of the bow. The true order of elimination then appears to be to drop first the spiral feather, then perhaps all feathering, then the notched butt, along with the bow itself, leaving a light, pointed and barbed lance, of which the Zulu assegai or the Greek javelin may be taken as types. Both of these are familiar from drawings and otherwise, and need not be described in detail, the shaft and barbed metal point being their leading characteristics, and both being adapted for either thrusting or hurling. Assuming that the progenitor of the arrow was a weapon of this character, we proceed in our work of elimination by taking away the metal point and substituting a point of ruder material—stone or bone. A barbed point is evidently an improvement on a plain lance point, so we next eliminate the barb. But the shaft having an attached point of harder material must have been preceded by a shaft having its point integral with it, a mere pointed rod, the type of which is used by the aborigines of South America in both their arrows and lances. To what does the next step in elimination lead us? To an unpointed rod, a blunt stick adapted for striking as well as thrusting, the bough of a tree broken off by the wind, or a stalk of cane—any rude provision of accident unmodified by human effort. Such a stick, in the hands of a person who used it with a thrust, and adapted or selected for such use, is the rudimentary type from which have come the lance, the arrow, the bayonet, all thrusting tools and weapons, even the spade and plough. Used as a striking implement or weapon, and selected or adapted for such use, from the same rudimentary type were evolved the club, the hammer, the axe, the sword, and all tools and weapons whose effectiveness depends on a swinging blow. If we had been pursuing the history of the axe, or sword, or spade, we should have reached the same result.

So many elements enter into every mechanical structure of our day that in attempting to read back their history we are like one who explores a river upward from its mouth. He must pass by many a minor affluent, and pursue that which appears to be the main stream. He may even mistake a tributary for the main stream, and so reach an ultimate source widely different in locality from

the actual one. No river, however, is fully explored till all its tributaries have been followed to their sources; and equally the history of no invention has been gathered until each of its components has been separately traced to its own near or remote origin. But as the little spring in western New York, which may give rise to the Alleghany, differs in no essential particular from the little spring thousands of miles away, from which the Missouri may take its ultimate rise, so with the two important elements, the shaft and attached point, which constitute the arrow. Some time in its history they have come together. I have chosen to eliminate the point as the subordinate and tributary element. If we prefer to eliminate the shaft and pursue the history of the point, we must take it as a type of cutting and piercing implements. We shall pass from knives of steel to knives of bronze, thence to knives of polished stone, thence to a ruder form of dressed flints, thence, perhaps, to such flakes of flint, or slate, or other material as presented themselves to man without preparation. Here, as in the case of the shaft, we find man in a state of nature using no art, but selection only. The shaft led us to a stick, the point, to a stone. The cutting edge which man found in a shell or splinter of cane might answer his purposes equally well, but whether shell or cane, or slate or flint, he used only what nature provided.

If, instead of following up the cylinder and piston of the steam engine, we had discarded these and pursued the history of the crank, so conspicuous in its structure, we could not trace it back of a recent historic period. Compared with the antiquity to which this study reaches, it is a modern invention, if not modern actually; but the wheel to which it is attached, if followed up, will lead us back through many intermediate steps to a savage rolling together logs and boulders for a shelter or defence. Here again, so far as able, he would use his selection out of what nature provided, but artificial preparation there was none.

From illustrations like these of the elaboration of inventions, (and they might be indefinitely multiplied,) it appears that the appliances, the arts, the tools and complex engines of modern industry and war may all be traced back to rude types in a few simple mechanical expedients which man possessed at his earliest origin, and employed, guided by his own selection, and which have been supplemented by other expedients from time to time discov-

ered or invented.* In the whole circumference of the arts every radius leads to the one center, where we find man, with intelligence enough to choose from what nature has provided that best adapted for his use, but, as yet, without skill or knowledge to alter or modify the rude material she furnishes.

What were these expedients of primitive man?

Such slight consideration as I have been able to give them, together with a contemplation of correlative facts in natural history, leads me to this belief: that the mechanical expedients possessed by the earliest human beings were such, and such only, as they possessed in common with the brutes. This belief is not affected by the question whether man was himself the product of evolution or of a special creation. The only difference would be that what in one case he possessed by inheritance, he must have acquired in the other by imitation. The question to be answered is, therefore, what were the mechanical expedients possessed by the brutes, which primitive man with his structure and needs may have inherited or imitated?

Without considering the wonderful manifestations of instinct in the higher mammals, or the ingenious contrivances of birds and insects, I shall regard only what is displayed to us in the natural history of those animals which are nearest to man in their physical structure, and from whom, or from creatures like whom, he must have inherited his earliest habits and instincts, or from observation of whom, he may have derived his notions regarding food, shelter, and the maintenance of his existence.

Since all the Simiadae are arboreal in their habits, we find them largely marked by similar characteristics, while in the Anthropo-

* Since this was written I have met with Mr. John Evans' address before the Department of Ethnology and Anthropology of the British Association for the Advancement of Science, at Liverpool, in 1870, in the course of which occurs the following language: "As the most eminent living naturalist conceives it not only possible, but probable, that all animals have descended from, at most, only four or five progenitors, and all plants from an equal or lesser number, so I think that an examination of the history of human arts and manufactures will reduce the material appliances possessed by our first progenitors to at least as small a tale." There are numerous hints in the same address that I would have found valuable in the preparation of the present paper, which may be regarded as a chapter in such an examination as Mr. Evans suggests. It is gratifying, however, to find some of the views I have enunciated confirmed in advance by the opinion of so eminent an authority

morpha there are special habits particularly claiming our attention. It is not always easy in a study of these to distinguish between the habits of the animal in its wild state, and those it has acquired by training or association with man. Unfortunately, writers on the habits of the apes and monkeys have generally studied them in the wire cages of the Botanical Garden, or as domestic pets, or possibly as stuffed specimens, and reliable details of their habits and practices when unaffected by the interference or proximity of man, are quite limited. Out of voluminous narratives of their instinct and cunning while under habitual human observation, with which popular works on natural history abound, I have culled a few facts which appear to relate to these animals in their natural state. I have not attempted to group or classify them, but present them in the order in which I happened to meet with them.

Some monkeys, in order to extract the meat from oysters, have been observed to thrust stones between their open shells. This is stated as a general fact, not attributed to any particular tribe or species.

Natives of the Gaboon country say the Chimpanzees unite to attack the elephant, the lion, and other beasts of prey with clubs and stones.

The Entellus will catch a sleeping snake by the neck and grind off his head on the nearest stone.

Some species of Cercopithecus fill their paws with dust or sand, and fling it at their assailants.

The Diana monkey used a stone to crack nuts and almonds.

The Green monkeys break off branches of trees to throw down on their enemies.

Of the Magot or Barbary ape it is said that they frighten and in some degree command the huge animals of the forest by pursuing them with hideous cries, and throwing down branches of trees on them. This practice of throwing down branches of trees is also related of the Stentor, one of the American apes.

The Atiles or Spider monkey catches mussels and oysters and crushes their shells by pounding them with stones.

Possibly careful search would fully confirm these meager facts. It is not likely it would add to them materially. Such as they are, they admit of a rude classification into—

1st. The use of stones as implements, involving the notion of the hammer and the wedge.

2d. The use of stones as missiles; and under this head I use the word stone as generic, including anything within the animal's reach adapted to be thrown by the hand.

3d. The use of branches of trees or sticks as clubs.

4th. The use of the same as missiles.

Beyond these, and of the greatest moment to this inquiry, is the well-recorded habit of shelter building by the Anthropomorpha, attributed to every species. Many writers allude to this, but the only description I have been able to find is by Du Chaillu, who says of the Nshiego-Mbouve, a species of Chimpanzee: "They build a kind of leafy nest among the boughs of the loftiest trees. This nest is composed of small interlaced branches, well thatched with leaves, and impenetrable to water. Fixed by firmly tied bands, it is generally from six to eight feet in diameter, and presents the form of a dome, an arrangement which readily throws off the water."*

From this incomplete description we conceive of a structure like the following: after a place has been selected in which the boughs by their natural forms and relations are adapted to the purpose, they are brought together so as to form a skeleton, or frame work. The interstices are then partially filled by interlacing either the smaller branches and twigs of the same boughs, or broken branches from the same or neighboring trees. Over this is laid a thatch of leaves, and the whole is secured by bands passing over it, which may be strips of some tough bark, flexible vines, or withes. Possibly this conception is more perfect and elaborate than the actual structure; but whether this is so or not, the mechanical expedients employed by the builder are most important additions to the list already observed. These are (5th) interlacing, or plaiting, which consists in passing the boughs in and out transversely of other boughs, in the familiar form of a hurdle or wattled hedge; and (6th) tying, the well known and only original method of securing two parts of a structure together by a third piece, of some flexible material. The important expedients of the thatch and sloping roof are also worthy of notice.

With our limited knowledge of the habits of these brutes in their native state, it is quite possible that we have not enumerated all the

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*I quote this from Figuier's Mammalia, page 603. The author attributes it to Du Chaillu without naming the work in which it is found.

mechanical expedients they possess. Such as we have found are enough for the present purpose. No one can imagine that man, in the lowest condition that may be attributed to him, can have possessed less. I shall therefore from this point regard them as his original endowment, in which can be recognized elements for the supply of all his prime necessities—food, shelter, and defence. As yet raiment was not a necessity.

The stone was an implement with which he procured food. Living on indigenous fruits and roots, and edible fungi perhaps, he seldom had use for implements; but the spectacle of a group of boys about an apple or chestnut tree reminds us how the stone might be used to bring down the fruit, and it obviously served a convenient use in cracking nuts, and as a wedge in circumventing the modest oyster. As a missile it was a means of attack and defence against savage beasts. The original uses of the stick were similar. It was both a striking and hurling implement, and was used both for procuring food and for attack and defence.

The expedients employed in the construction of his shelter were presumably not at first used by man for any other purpose; but they involved the two arts of tying and plaiting, and for the practice of the former the possession of the thong of bark or withe.

Man must have supplemented these expedients with the knowledge of some material facts. He observed, for instance, that bodies left to themselves fall to the ground, and he can hardly have failed to recognize this as a general truth from the moment he was capable of any sort of generalization. He could distinguish such properties in bodies as weight and lightness, that some float in water while others sink, and that some are easily wafted by the wind while others hold solidly against it. He had lacerated his hands and feet on the sharp edges of rocks and shells, and thorns and briars had pierced his flesh, so that he must have known the cutting edge and penetrating point long before he availed himself of them for any use. These did not require to be discovered or invented, but were a provision of nature, waiting, as doubtless many provisions of nature are waiting yet, for the sluggish human mind to find uses for them.

The conditions under which man employed these expedients differed widely from those under which they were used by the quadrumanous and arboreal creatures in whose possession we have found them. Erect, plantigrade, and terrestrial, striking and hurling

implements have acquired in his hands a new importance. Their use, hitherto frantic and incidental, has become deliberate and habitual, and, through the higher structure and continued practice, skill, precision, and effectiveness have been developed. The shelter, built by the Chimpanzees in the tops of trees only, and framed from the growing boughs, man forms from contiguous saplings bound together at their tops, and supplemented by gathered poles or reeds.* New materials may have found their way into its structure, and it may have increased in dimensions and in its adaptedness for permanent use.

Whether reason be a growth or a new faculty bestowed complete upon man, its first practical employment must have been upon material things, such as he was most immediately concerned with. His daily pressing wants, the means of securing food and shelter and repelling attacks, these were the subjects of his contemplation. By such contemplation and his acquired dexterity, supplemented by the narrow range of facts within his knowledge, he is guided to new expedients. For instance, observing the solidity of rocks and bowlders, he might have secured his shelter by lashing it to them. He might have found in grass and rushes more suitable materials than the boughs and leaves for binding the poles and saplings of its frame, for weaving into its interstices, and for its thatched roof. He may have become dexterous in the arts of thatching and plaiting, and learned new and varied and secure forms of knots. Useing his judgment and selection, with experience he discerned what stones and pebbles were best adapted for his various uses, the round pebble of the brook for hurling, the sharp-edged flake for a wedge,

* Compare this with the description of the first human shelter given by Viollet le-Duc in his charming work, "Habitations of Men." "Epergos selects two young trees a few paces apart. Climbing one of these, he bends it down by his weight, pulls towards it the top of the other, and thus joining the branches of the two, ties them together with rushes. The creatures round him find other young trees in the neighborhood. With their hands and with the help of sticks they uproot them and drag them to Epergos, who shows them how they should be inclined in a circle by resting their tops against the first two trees. Then he shows them how to fill in the space with rushes, branches, and long grass interlaced, then, how the roots should be covered with clay, and the whole structure successively, leaving an opening on the side opposite the wind." The author appears to have reached the notion of this shelter by a process of elimination, but it is evident he could have gone a step further, and found its origin, without the need of calling in the aid of a superior being.

and such stones as afforded a convenient hand-grasp for striking. In the same way he found that particular forms of sticks were better adapted for special uses; that to strike a powerful swinging blow, the greater weight should be remote from the hand; while for effective hurling, it might be more evenly distributed. And he found new uses for the stick. He may have acquired its use as a lever, and so possessed two of the mechanical powers. But we must ascribe to an early period among the distant ages under consideration the first employment of the stick as a thrusting weapon. Herein is a clear separation from all brute usages, which seem to be confined to aimless brandishing, striking, and throwing; and for its effective use in this way, man must have observed that instead of having the heavy end remote from him, as for a swinging blow, the smaller end must be advanced; and so with no notion yet of improving on nature or accident by artificially pointing his stick, he selects for use with a thrust such sticks as are slender and reduced at their extremities. In these improved methods of using the old expedients, in these rude steps in progress marked by departures from brute usages, we may discern the feeble exercise of reason. Man did not begin at once to reason profoundly. His first notions of cause and effect, and of adapting means to ends, were of the humblest character, restricted by the narrow range of facts in his possession. With so slender a store of facts the reason of Newton or Bacon could have had no wider scope.

In the ground I have gone over, I have roughly traced the original stock of mechanical expedients through three stages: their use by brutes, which we may regard as at the most casual and fragmentary; then their habitual use by man; and then their use by man under conditions involving judgment, selection, and dexterity. The next stage is one in which improvements begin to be made on the old expedients in adapting them to new uses and to the supply of new wants. This is the first stage of invention.

It would be impossible to determine what was actually the first of human inventions. It is probable that instead of one there were several, called forth by diverse needs and conditions, and so nearly contemporaneous that neither can be regarded as antedating the other. I think it might be shown also that there exists a certain natural order in mechanical invention, under which the process and and product precede the tool or machine by which they are after-

wards produced. We may be sure that the notion of striking is older than the rudest artificial striking implement; that of propelling the arrow, than the bow; that of navigating the water, than boats; those of pottery and a textile fabric, than the wheel and loom. The process is performed and the product realized by some already known and rude expedient before the demand is created for improved tools to perform the process. Hence, we ought to expect the first inventions to be arts or processes rather than products or implements. Necessity is, in a certain sense, the mother of invention, but this is by no means the whole genesis. The history of the subject will show that the necessities which give birth to inventions are generally the offspring of prior inventions or prior known expedients. Keeping these considerations in view, let us briefly consider the form which two or three primitive inventions may have taken:

1. The club did not need to be invented. It was a stick, in which roughness was no objection, and which, as experience had taught, operated most effectively with a heavier and lighter end. Since this is the natural form of growing wood, nothing but selection was required to provide man with this weapon from the boughs torn from the trees by wind or otherwise. So with the hurling stick. Improved forms and fashions may have developed at a later period with the introduction of the art of wood-working; but for the period in question these weapons were the gift of nature. As I have before said, however, man had found a new use for the stick—as a thrusting weapon; and I cannot but conceive that this use, once acquired, must have been a favorite one. By means of it a comparatively heavy blow is struck with a light shaft, and, at the same time, it was observed that the attitudes required in its use, in attack and defence, were securer than those necessitated in the use of the club. One is a cover as well as a weapon; the other leaves the whole body exposed. In contests of every kind this advantage was not to be overlooked. As compared with the club, the pike is the higher type of weapon, exactly as the rapier is in comparison with the broad sword, or the bayonet with the battle axe, and in its use, even in the primitive form of a blunt stick, man must have been conscious of new power. He was not long (as we must reckon time at that period) in finding the adaptation to this use of splintered fragments of timber, which accident had pointed, and in the

exercise of his selection such splinters were eagerly sought for and may have been carefully treasured.

There came a time when, pointed sticks being in demand, some genius conceived the idea of artificially pointing a common stick. In dragging over the rocks the poles for his shelter he had observed the abrading effect on their ends, and putting his knowledge to practical use he pointed a shaft by rubbing it on the rough surface of a rock. Here was an actual invention of the first magnitude—not of the pike be it observed, nor of the rough rock, these existed already; but of the art or process of working wood by abrasion.

This art, once introduced, must have become a prolific parent. When man found it in his power to modify or improve the form of timber, he may have begun to apply the art to the perfection of his club—as in giving it a more convenient hand-grasp. The time was to come when he would find that the same result could be accomplished by applying a scraping or cutting implement to the wood, rather than the wood to the rock, and then he would begin to devise implements for convenient use. He was also to find that he had the power to change the form of other materials, such as shell or bone, and would devise appropriate processes and tools for the purpose. But these are more advanced steps in invention, with which we are not now dealing.

2. Another of man's original endowments was the use of the stone for throwing. By his power of selection he had determined what stones and pebbles were best adapted to his purpose, and by virtue partly of his higher structure, partly of his practice, had acquired expertness and precision. Important as this expedient was to him, the throwing stone once used was no longer of value and was left where it fell.

I can conceive that in his wanderings man may have come upon vast alluvial regions, where for long distances not a pebble was to be found. Here fruits and nuts adapted for food were growing, but practically out of his reach for want of his accustomed means of procuring them. Here also were savage beasts, but his accustomed means of defence against them were wanting. It might then have occurred to him to transport thither pebbles from some other point. In attempting to carry out this project he was met, as men have ever since been met in handling artillery, by the problem of transportation. Nature, which had blessed the Cercopithecus with cheek-pouches and the marsupials with capacious pockets, had not been

so beneficent to the *genus homo*. His carrying capacity was limited to what his two hands would hold. Vessels and receptacles of every kind were for the future to devise. How was the inventor of the day to solve the problem? It has been remarked that man had probably lashed his shelter to the rocks and bowlders, and in doing this had learned to secure a thong to loose and rounded stones about which it could be passed. These were larger and smaller, sometimes with his untrained judgment too small for much service, and in such instances they might often have been moved about by the thongs attached to them. It could not have been an extraordinary suggestion to put this expedient in practice to supply the new want. While, without some such expedient, man was limited in his carrying capacity to a pebble in each hand, he found that, by securing a slender thong to each, he could carry (or drag) quite a number in each hand. Here was a combination* of the thong with the pebble; two old elements uniting to form a new structure with special functions, and in it were all the elements of invention. But, like Humphrey Potter's *scoggan*, there was more in it than the inventor thought of. It solved the question of transportation, as his invention did that of playing marbles; but when the weary man, after a toilsome day's travel with his unaccustomed burden, was about to seek repose and carelessly tossed it from him, he could have observed that he had done much more than to make a conveniently portable missile, and had added new effectiveness to the missile itself. By means of the thong he had given the stone greater velocity and longer range, and practically added to the power of his own arm. In short, he had invented the precursor of the *bolas*, the effective weapon of the Patagonians. We can see the type of it in the slung-shot, the convenient and deadly contrivance favored by the savages of New York and London.

Out of this invention afterwards grew another. Some pebble, insecurely fastened, flew from its lashing and went whirling far, leaving its thong in the thrower's hand. A number of experiences like this might have suggested such a contrivance of the lashing that the stone could be discharged at will; and the sling was invented, of the type of that made by the ancient inhabitants of Sweden out of the bark of the linden. While these do not appear to have been the parents of numerous inventions, having at a remote

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*I use the word "combination" in the strictly technical sense of patent law.

period been generally supplanted by other forms of arms, they may be regarded as containing the first suggestions of long-range missiles, and we may trace to them such engines as the ballista and catapult, and, by a very slender connection, the cannon and other fire-arms.

3. Among the rude expedients employed by primitive man in the construction of his shelter was that of interlacing smaller lateral boughs with the upright poles or saplings. It is not unlikely, as I have before remarked, that at a very early period he so far modified this expedient as, when the conditions favored, to interlace grass or rushes with the boughs, and by this better material to increase the tightness of the structure. From plaiting or interweaving rushes with boughs it was but a short step to plait rushes with rushes, to make movable parts to cover needful openings; and so was formed the rush mat—the parent and prototype of all textile fabrics. Here was an invention involving both the process and product, long before flax was spun or flocks kept.

4. In the construction of his shelter with light and insecure materials, stability had been attained by lashing it to such objects as had great weight or were firmly fixed in the ground. Roots and fallen trunks, rocks and bowlders had answered to these conditions; but their use left the builder without the free exercise of his selection as to the place his shelter should occupy. In using these means quite frequently the spot would be one exposed, in case of storms, to overflow or to be swept by torrents; and it was a suggestion of no small moment to roll the loose bowlders from their native beds to higher ground, and secure the frail fabric to a number of them arranged in a circle about it. Here was the first step in the use of more lasting materials in architecture, and an invention which was to transform the temporary shelter into the permanent house. From a mere ring of anchoring bowlders came in time the foundation, raising the superstructure from the ground, and by additional courses reaching some rude form of Pelasgic wall.

If any of these inventions seem to be puerile, it is to be remembered that we are dealing with the remotest infancy of the human race. In the condition in which man must be presumed to have been at this period, they are inventions of a high order. I have selected them because they grow naturally out of the expedients with which man was primitively endowed, and because they may have been, and some of them must have been, made long before any

dressing of flints or bone or the artificial preparation of any material that can long survive the action of natural decay. Indeed, unless all reasoning from analogy is at fault, the working of the softer material must have preceded the working of the harder. Man must have constructed pointed instruments of an inferior character and learned their value, before he conceived the idea of improving them by attached points of better material, or of constructing tools to make them better and more expeditiously. The remains of these early arts will never disclose themselves to archæologic research. The wood and bark and rushes have passed away, and the pebbles that may have been so effective in peace and war are indistinguishable from any pebbles of the brook. But we do not need this material evidence. No art is known to us that has not grown up from simpler and ruder arts. This is a truth which does not belong to our time, but to the arts themselves. What is true of the inventions of Watt and Edison is true of those of Osiris and Tubal-Cain, and equally true of those of the unknown and naked savage, whose arts form the subject of our inquiry; and we need no further assurance that back beyond the remotest period to which the rudest wrought stone implements can be ascribed, a thinking, reasoning, inventive man must have developed arts and progress capable of leading up to the construction of such implements.

I hope it will not be forgotten that the title of this paper restricts it to an inquiry. I have attempted to demonstrate nothing, since I had no preconceptions to maintain, or at least none which the first steps in the inquiry did not remove. The convictions I have stated are those which have formed in my own mind during the preparation of the paper, and since they point to conclusions quite at variance with those of prominent European anthropologists, I beg leave to dwell on them a moment, and to state the nature of these conclusions.

In Prof. Boyd Dawkins' recent valuable work on "Early Man in Britain,"* he discusses at some length the probabilities of man's existence in the different successive stages of the Tertiary period, finding no proof of his appearance till the Pleistocene. It having been maintained by very high authority on the other side of the

* London, 1880.

British channel that man inhabited France as early as the middle of the Miocene, he alludes briefly to the evidence on which that opinion is partly founded, to wit: the flint splinters found in the Mid-Miocene strata of Thenay. He expresses doubt* as to whether these splinters are actually artificial, and suggests that, if they are so, they may have been the work of one of the higher apes rather than of man. This view, he adds, agrees with that of Prof. Gaudry, who had suggested as their author the Dryopithecus, the great anthropoid ape then living in France. This view is quite earnestly combatted by Mr. Grant Allen, in a paper entitled "Who was Primitive Man?" in the *Fortnightly Review* for September, 1882, in which the writer declares his belief in the artificial origin of these rude splinters, and the evidence that they are of the Mid-Miocene period, but ascribes them to what he calls "a man-like animal," "acquainted with the uses of fire, and sufficiently intelligent to split rude flakes of flint," such a creature being in his view one of the links in the evolution of man, and his existence at that period being in harmony with that doctrine. These flints have occasioned much discussion in Europe, and the opinions quoted are fairly representative of those expressed by many authors.

It is clear that neither to Prof. Dawkins and Prof. Gaudry, nor to their critic, is it hard to imagine that a creature, inferior to man both in physical and mental structure, may have made such progress in art as to be able to work so difficult a material as flint, and have developed such wants as to call for the practice of that art. If they do not mean this, their language is meaningless.† There is no

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*A very reasonable doubt in view of the result of the careful examination made by a jury of fifteen experts at the Prehistoric Congress at Brussels, in 1872. Five members of the jury declared that they could not discover any evidence of human workmanship in the thirty-two specimens exhibited.

†In a foot-note (p. 69) Prof. Dawkins says: "Even if the existing apes do not now make stone implements or cut bones, it does not follow that the extinct apes were equally ignorant, because some extinct animals are known to have been more highly organized than any of the living members of their class." When the question is regarded from its mechanical side, the pertinency of this suggestion is not obvious. It does not turn on actual knowledge how to shape flints, but on the process by which that knowledge was gained, and on the development of wants which made the exercise of the knowledge necessary. It is safe to presume, on the basis of evolution by natural selection, that, if at any geological period prior to the advent of man, apes had made the progress in art claimed for them, there would have been no room for man on earth: his place would have been taken.

practical difference between their notions. Both lose sight of the nature of art and the laws of human progress, and both indicate a conception of art prior to man, but an inability to conceive of man as existing without a certain degree of progress in art.

In fact the conception of man as existing prior to the fabrication of stone implements seems to be foreign to the ideas of those who have discussed his origin and antiquity. In the minds of anthropological writers it would seem that the first human creature, whatever his origin, must have signalized his advent and perpetuated his memory literally in a

"*Monumentum aere perennius*," *

by instantly, without preparation or conscious need, chipping out tools of flint. Only in the fancy of a Roman poet, who had never heard of neolithic or palæolithic ages, do we find a conception of the rudeness and absolute dependence on the gifts of nature of the primitive man, whose earliest arms were his fists, nails and teeth, and stones and broken limbs of trees.†

Coming to this subject, not as a student of the antiquity of man, but only as one whose daily business is the study of inventions, I find it presents to my mind an aspect more like the poetic fancy of

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* Horace, Lib. III, Ode 30.—The poet, in the following lines, well describes the enduring character of these memorials:

"*Quod non imber edax, non Aquilo impotens*
Possit diruere, aut innumerabiles
Annorum series, et fuga temporum."

† Lucretius' *De Rerum Natura*, Lib. V:

Arma antiqua manus, ungues, dentes fuere,
Et lapides, et item sylvarum fragmina rami.

The quotation is familiar, having been cited in connection with the four succeeding lines, to show that the conception of three stages of civilization known as the ages of Stone, Bronze, and Iron were recognized by the ancients. I hazard the criticism that, while it clearly indicates a bronze period earlier than that of iron, it contains nothing that was meant to suggest what is now understood by the stone age. There is nothing in *lapides* that implies that the stones are wrought in any way, or are anything but such provision as nature furnishes in loose fragments and pebbles. The poet puts them in the same category and in the same stage with *fragmina rami*, which certainly does not mean dressed timber. I doubt if *lapis* is ever used for a flint stone. Some authors (see Vitr. 8, 1) use *saxum silex*, and Plautus (Capt. 3, 4, 84) uses *saxum* alone for a flint implement with which victims were slain.

Lucretius painted it than like that of the authors I have quoted. The maxim "Art is long," is true, not only of its duration, but of its growth; and in this sense not more true of the finished work of the Greek sculptor, than of the jagged flints, our only memorials of man in the earliest of the uncounted centuries of the palæolithic age.

The dressing of flint in any rude form by any creature must have begun long subsequently to the dressing of less difficult materials, since some such antecedents were necessary to develop the need of flint implements and the art of producing them. Hence I cannot conceive that the flints of Thenay, if artificial, can be the production of any creature less than a fully developed man. The human attributes of thought, reason, and invention were necessary for their fabrication, because all these were required in the antecedent steps which led up thereto. To me it is as easy and reasonable to attribute to an ape or a man-like animal the first wrought bronze or iron as the first wrought flint. Not less true, if applied to the mechanic arts, is William Humboldt's pregnant paradox: "Man is man only by means of speech, but in order to invent speech he must be already man." Indeed this thought applies with greater emphasis to mechanical invention than to vocal speech. We can easily suppose that man may have made as great advance in arts as I have described in this paper before his unformed speech had become distinguishable from the chatter of the beasts around him. It must have been one of the immediate results of his early mechanical progress to give large increments to language by the new ideas and wants which the arts engendered. It is not impossible that spoken language may have originated at this era, and so the man who invented speech must prior thereto have been a man by means of his mechanical inventions—to make which he must have been already man.

We should probably search in vain among the lowest savage people known to us for a living type of our most ancient human progenitor; low as his type may have been, he was neither anthropoid nor pithecoid, but completely human, whether he made his appearance in the Post-Pliocene or in the Mid-Miocene, or whether he was the product of a special creation a few thousand years ago.

Obviously archæology can find no trace of a remoter age than that of stone, but I mistrust that the thoughtful anthropologist will accept the evidence of earlier ages, one of which, taking one of its

perishable materials as the type of all, we may call the age of wood. Still further back must lie an age, as indefinite in duration as any, when man existed in his rudest condition, without arts of any kind, except such as he employed in common with lower animals, and this is the true primitive period. In such ages as these, just on the hither side of the indeterminate border which divides man from the brute creation, we must look for the beginnings of his mechanic arts, and with them of human history.

The discussion was participated in by Messrs. Rock, Mason, Fay, and others.

Mr. Ivan Petroff then read part of his paper on "Aleutian Songs and Traditions," the hour of adjournment having arrived before he concluded.

Sixty-Sixth Regular Meeting, March 6th, 1883.

Colonel Garrick Mallery, President, in the chair.

The Secretary, in the absence of the Curator, reported the following gift:

From the Academy.—Antiquarian proceedings from the Kongl. Vitterhets Historie och Antiquitats Akademiens of Stockholm, for the years 1872–'81, inclusive.

Mr. Petroff then read the concluding portion of his paper on "Aleutian Songs and Myths," of which an abstract has been been submitted.

ABSTRACT.

After referring briefly to the origin of the term *Aleut*, which he traced to the Kamchatkan river Olutora, and a group of islands named after the same on the earliest Russian maps, the speaker expressed the opinion that the tribal name of the people should be pronounced Unangan instead of Unŭngŭn adopted by Mr. Dall, the former reading being also supported by the authority of Veniaminof. Mr. Petroff then recited some traditions of the origin of man, the earliest having been collected in 1815 by Louis Choris. Nearly all these myths represent at least one of the first couple as a dog, the children gradually assuming human shape. The myths also

agree in the statement that the first men came to the island from the north. During his travels in continental Alaska Mr. Petroff met with some traditions corroborative of those of the Aleut. The later traditions of the tribe refer chiefly to warlike expeditions to the northward and eastward. One myth relating the origin of the sea otter was pointed out as furnishing almost the only explanation of the universal belief in the abhorrence on the part of the sea otter of anything that might remind it of the sexual relations of man and woman.

Of Aleutian songs, Mr. Petroff said that though without rhythm or rhyme they were not without poetic thoughts and ideas. The lack of rhythm is made up by the addition of meaningless syllables, such as *ánga*, *ángara*, or *aiá*, at the end of each line. The most popular songs are those reciting the deeds of warriors or hunters; but a few specimens have been preserved of love songs, of which Mr. Petroff read both verbal and modified translations.

DISCUSSION.

Mr. GATSCHET inquired whether the speaker found actual consonance and metre, or only the prosodic accent and assonance.

Mr. PETROFF repeated that lack of rhythm was made up by the addition of syllables at the end of each line, to which reference had been made in the paper.

THE CARSON FOOTPRINTS.

Mr. GILBERT spoke with reference to the supposed human footprints discovered at Carson, Nevada, communicating some of the results reached by his assistant, Mr. I. C. Russell, who visited the locality for the purpose of ascertaining the geological relations of the deposit bearing the impressions. During a period of geological time, which is certainly not remote, the valleys of Nevada have been occupied by an extensive system of lakes, and these are believed by all who have investigated them to have been the contemporaries of the ancient glaciers of the Sierra Nevada and Wasatch, and therefore of Quaternary age. Mr. Russell's investigations led him to assign to the Carson strata an earlier date. Without considering the palæontological evidence he ranks them Tertiary; thus according with Professors Marsh and Cope, who refer the mammalian fossils to the Upper Pliocene.

To account for the peculiar footprints Mr. Russell suggested the same explanation which had been, unknown to him, proposed by

Professor Marsh, namely, that they were produced by a gigantic edentate; but no edentate bones have as yet been recognized in the fossils of the locality.

Prof. MASON then inquired whether the Secretary had not entertained the belief that the impressions were human, as an article in the *Revue d'Anthropologie*, professing to quote Dr. Hoffman, stated them to be those of Tertiary man.

The Secretary replied that the paper which had been presented last autumn, immediately after his return from Carson, contained no such statement, but called attention to the striking similarity between the fossil impressions and those of the ordinary imprint of a foot incased in a moccason or shod with a sandal. The error in the *Revue* was made after the paper left the author's hands. The Secretary remarked further that a cast of a typical impression had been on exhibition before the Society during the evening on which that paper was read, and every feature was characteristic of a human foot, though the belief was not entertained that primitive man had produced it. Some of the impressions at Carson are over six inches in depth, and yet in none of them is there any appearance that might suggest the presence of claws, such as would naturally exist in animals of the sloth family. Neither was there any evidence of an oblique indentation caused by the outer edge of the foot being put down first, as we find the sloths walk; a habit which no doubt existed to some extent in the fossil forms.

SIXTY-SEVENTH REGULAR MEETING, March 20th, 1883.

Colonel GARRICK MALLERY, the President, occupied the Chair.

The Council reported, through its Secretary, the following names of foreign anthropologists who had been duly elected Honorary Members. The list, as read by Professor Mason, is as follows:

ANOUTCHINE, DEMETRI, Moscow, Russia.
BEDDOE, Dr. JOHN, Bristol, England.
BASTIAN, Prof. ADOLF, Berlin, Prussia.
BUSK, Prof. GEORGE, London, England.
CAPELLINI, Prof. G., Bologna, Italy.
CARTAILHAC, EMILE, Toulouse, France.
CHANTRE, ERNEST, Lyons, France.

ENGELHARDT, C., Copenhagen, Denmark.
EVANS, JOHN, London, England.
FISHER, Prof. H., Freiburg, Baden.
FISON, Rev. LORIMER, Navuloa, Fiji Islands.
FLOWER, Prof. WILLIAM H., London, England.
HAECKEL, Prof. ERNST, Jena, Germany.
HIS, Prof. W., Leipzig, Germany.
HOVELACQUE, Prof. ABEL, Paris, France.
HUXLEY, Prof. THOMAS H., London, England.
ICAZBALCETA, Señor JOAQUIM GARCIA, Mexico, Mexico.
LUBBOCK, Sir JOHN, London, England.
MANTEGAZZA, Prof. PAULO, Florence, Italy.
MAINE, Sir HENRY S., London, England.
MEYER, Dr. A. B., Leipzig, Germany.
MORTILLET, Prof. GABRIEL DE, Paris, France.
MUCH, Prof. M., Vienna, Austria.
MULLER, Prof. FREDERICK, Vienna, Austria.
NILLSON, Prof. SVEN, Lund, Sweden.
PITT-RIVERS, Maj. Gen., London, England.
POZZI, Dr. SAMUEL, Paris, France.
QUATREFAGES, Prof. A. DE, Paris, France.
RETZIUS, Prof. GUSTAV, Stockholm, Sweden.
SAYCE, Prof. A. H., Oxford, England.
SCHAFFHAUSEN, Prof. H., Bonn, Germany.
SCHMIDT, Dr. EMIL, Essen, Prussia.
SCHMIDT, Prof. WALDEMAR, Copenhagen, Denmark.
STEENSTRUP, Prof. JAPETUS, Copenhagen, Denmark.
TOPINARD, Dr. PAUL, Paris, France.
TYLOR, EDWARD B., London, England.
VIRCHOW, Prof. RUDOLPH, Berlin, Germany.
VOGT, Prof. CARL, Geneva, Switzerland.
WORSAAE, J. J. A., Copenhagen, Denmark.

In the absence of the Curator, the Secretary made the following report of gifts received since the previous meeting:

From Major J. W. POWELL.—The First Annual Report of the Bureau of Ethnology, Washington, D. C., 1881.
From ARNI THORSTEINSON.—Árbók hins Islenzka Fornleifafélags, 1880, 1881, 1882.
From J. H. RIVETT-CARNAC.—Four polished celts of diorite, of normal type, showing gradations in size; one ringstone, or

"macehead;" one cast of a grooved stone hammer; one chipped celt of basalt, and a collection of cores, spalls, and flakes. All collected in the Banda District, Northwestern Provinces, India.

The President then stated that through the courtesy of the Surgeon General of the Army, rooms for the future meetings of the Society had been secured in the Army Medical Museum. He congratulated the members upon the very pleasant quarters in which they were hereafter to meet.

Mr. W. H. HOLMES read the following paper on "ART IN SHELL," which was illustrated with both specimens and sketches:

Attention has been but recently called to the fact that shells and shell material have held a very important place in the arts of the ancient peoples of this country.* Unworked shells have been employed in a variety of ways, according to their adaptability to the wants of man. They have also been artificially shaped, after the fashion of other materials, to add to their convenience as implements, utensils, and weapons. Their chief interest, however, lies in the special uses to which they have been applied. I refer to their employment by the primitive engraver as tablets on which to depict a variety of graphic conceptions. These tablets are generally disk-like in form and are pierced near the margin for suspension about the neck. As a rule, they are cut from the most expanded portions of large marine univalves, notably the *Busycon perversum*.

The concave outer surface is seldom used; but the interior, which is by nature beautifully polished, has received the engraved design.

There are also many pendants with plain surfaces which may have had particular significance to their possessors, as insignia, amulets, or symbols, or may have received painted designs of such a character as to give significance to them. But we find that many of the larger gorgets obtained from mounds and graves of a large district have engraved upon them designs of a most interesting nature, which are so remarkable in conception and execution as to command our admiration. Such is the character of these designs that we are at once impressed with the idea that they are not products of the idle fancy. I have given much time to their examination,

* Art in Shell. Second Annual Report of the Bureau of Ethnology. In press.

and, day by day, have become more strongly impressed with the belief that no single design is without its significance; and that their production was a serious art, which dealt with matters closely interwoven with the history, mythology, and polity of a people gradually developing a civilization of their own.

Although these objects were worn as personal ornaments, they probably had specialized uses as insignia, amulets, or symbols.

As *insignia*, they were badges of office or distinction. The devices engraved upon them were derived from many sources, and were probably sometimes supplemented by numeral records representing enemies killed, prisoners taken, or other deeds accomplished.

As *amulets*, they were invested with protective or remedial attributes, and contained mystic devices derived from dreams, visions, and many other sources.

As *symbols*, they possessed, in most cases, a religious character, and were generally used as *totems* of clans. They were inscribed with characters derived chiefly from mythologic sources. A few examples contain geometric designs which may have been *time-symbols*.

That these objects should be classed under one of these heads and not as simple ornaments engraved with intricate designs for embellishment alone, is apparent when we consider the serious character of the work, the great amount of labor and patience shown, the frequent recurrence of the same design, the wide distribution of particular forms, the preservation of the idea in all cases, no matter what shortcomings occur in execution or detail, and the apparent absence of all lines, dots, and figures not essential to the presentation of the conception.

In describing these gorgets I have arranged them in groups distinguished by the designs engraved upon them. They are presented in the following order:

The Cross,
The Scalloped Disk,
The Bird,
The Spider,
The Serpent,
The Human Face,
The Human Figure.

Within the United States ancient tablets containing engraved

designs are apparently confined to the Atlantic slope, and are not found to any extent beyond the limits of the district occupied by the stone-grave people. Early explorers along the Atlantic coast mention the use of engraved gorgets by a number of tribes. Modern examples may be found occasionally among the Indians of the northwest coast as well as upon the islands of the central Pacific.

The symbol of the cross, which occurs in various forms in the art of the mound builder, is first in order, but, as my subject is extremely large, I shall omit its consideration for the present.

Scalloped Disks.—In making a hasty classification of the many engraved gorgets I have found it convenient to place in one group a numerous and somewhat extraordinary class of designs which have been engraved upon scalloped disks. Like the cross, the symbol here represented is one that cannot with certainty be referred to an original. The general shape of the disks is such as to suggest to most minds a likeness to the sun, the scallops being suggestive of the rays. As this orb is known to be an object of first importance in the economy of life—the source of light and heat—it is naturally an object of veneration among many primitive peoples. It is well known that the barbarian tribes of Mexico and South America had well-developed systems of sun-worship, and that they employed symbols of many forms, some of which still retained a likeness to the original, while others had assumed the garb of animals or fanciful creatures. These facts being known, it seems natural that such a symbol as the one under consideration should be referred to the great original which it suggests.

The well-known fact that the district from which these gorgets come was, at the time of discovery by the whites, inhabited by a race of sun-worshipers—the Natchez—gives to this assumption a shadow of confirmation. So far as I am aware, however, no one has ventured a positive opinion in regard to their significance, but such suggestions as have been made incline toward the view indicated. I feel the great necessity of caution in such matters, and, while combatting the idea that the designs are ornamental or fanciful only, I am far from attributing to them any deeply mysterious significance. They may in some way or other indicate political or religious station, or they may even be cosmogenic, but the probabilities are much greater that they are time symbols. Before venturing further, however, it will be well to describe one of these disks. I have examined upwards of thirty of these, the majority of which

are made of shell; a typical example is presented in Fig. 1. This specimen was obtained from a mound near Nashville, Tenn., by Prof. Powell. It was found near the head of a skeleton, which was much decayed, and had been so disturbed by recent movements of

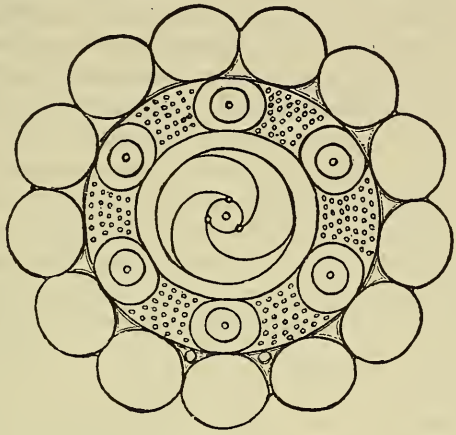

FIG. 1.

Shell disk from a mound at Nashville, Tennessee.

the soil as to render it difficult to determine its original position. The shell used is apparently a large specimen of the *Busycon perversum*, although the lines of growth are not sufficiently well preserved to make a positive determination of the species. The substance of the shell is well preserved; the surface was once highly polished, but is now pitted and discolored by age. The design is engraved on the concave surface as usual, and the lines are accurately drawn and clearly cut. The various concentric circles are drawn with almost geometric accuracy around a minute shallow pit as a center. These circles divide the surface into five parts—a small circle at the center being surrounded by four zones of unequal width. The central circle is three-eighths of an inch in diameter, and is surrounded by a zone one-half an inch in width, which contains a rosette of three involuted lines; these begin on the circumference of the inner circle in three small equidistant perforations, and sweep outward to the second circle, making upwards of half a revolution. These lines are somewhat wider and more deeply engraved than the other lines of the design. In many specimens

they are so deeply cut in the middle part of the curve as to penetrate the disk, producing crescent-shaped perforations. The second zone is one-fourth of an inch in width, and in this, as in all other specimens, is quite plain. The third zone is one-half an inch in width, and exhibits some very interesting features. We find placed at almost equal intervals six circular figures, each of which incloses a circlet and a small central pit. The spaces between the circular figures are thickly dotted with minute conical pits somewhat irregularly placed; the number of dots in each space varies from thirty-six to forty, making nearly two hundred and thirty in all.

The outer zone is subdivided into thirteen compartments, in each of which a nearly circular figure or boss has been carved, the outer edges of which form the scalloped outline of the gorget. Two medium sized perforations for suspension have been made near the inner margin of one of the bosses and next to the dotted zone; these show slight indications of abrasion by the cord of suspension. These perforations, as well as the three near the center, have been bored mainly from the convex side of the disk.

Whatever may be the meaning of this design, we cannot fail to recognize the important fact that it is significant,—that an idea is expressed. Were the design ornamental, we should expect variation in the parts or details of different specimens resulting from difference of taste in the designers; if simply copied from an original example for sale or trade, we might expect a certain number of exact reproductions: but in such a case, when variations did occur, they would hardly be found to follow uniform or fixed lines; there would also be variation in the relation of the parts of the conception as well as in the number of particular parts; the zones would not follow each other in exactly the same order; particular figures would not be confined to particular zones; the rays of the volute would not always have a sinistral turn, or the form of the tablet be always circular and scalloped. It cannot be supposed that, of the whole number of these objects at one time in use, more than a small number have been rescued from decay; and these have been obtained from widely scattered localities, and doubtless represent centuries of time, yet no variants appear which indicate a leading up to or a divergence from the one original central idea. A design of purely ornamental character, even if executed by the same hand, could not, in the nature of things, exhibit the uniformity in variation here shown. Fancy, unfettered by ideas of a fixed nature,

such as those pertaining to religious or sociologic customs, would vary with the locality, the day, the year, or the life.

The student will hardly fail to notice the resemblance of these disks to the calendars or time symbols of Mexico and other southern nations of antiquity. There is, however, no absolute identity with southern examples. The involute design in the center resembles the Aztec symbol of day, but is peculiar in its division into three parts, four being the number almost universally used. The only division into three that I have noticed occurs in the calendar of the Muyscas, in which three days constitute a week. The circlets and bosses of the outer zones give them a pretty close resemblance to the month and year zones of the southern calendars.

My suggestion that these objects may be calendar disks will not seem unreasonable, when we remember that time symbols do make their appearance with many nations during the early stages of barbarism. They are the result of attempts to fix accurately the divisions of time for the regulation of religious rites, and among the nations of the south constitute the great body of art. No well developed calendar is known among the wild tribes of North America, the highest achievements in this line consisting of simple pictographic symbols of the years; but there is no reason why the mound-builders should not have achieved a pretty accurate division of time resembling, in its main features, the systems of their southern neighbors.

The Bird.—With nearly all peoples the bird has been an important symbol. Possessing the mysterious power of flight, by means of which it could rise at pleasure into the realms of space, it naturally came to be associated with the phenomena of the sky,—the wind, the thunder, the lightning, and the rain. In the fervid imagination of the red man it became the actual ruler of the elements, the guardian of the four quarters of the heavens. As a result of this the bird is embodied in the philosophy of many tribes. The eagle, the swan, the woodpecker, the owl, and the dove were creatures of unusual consideration; their flight was noted as a matter of vital importance, as it served to indicate the future fortunes of the hunter and warrior.

The dove, with the Hurons, was thought to be the keeper of the souls of the dead, and the Navajos are said to believe that four white swans dwell in the four quarters of the heavens and rule the winds.

The storm-bird of the Dakotas dwells in the upper air, beyond the range of human vision, carrying upon its back a lake of fresh water; when it winks its eyes, there is lightning; when it flaps its wings, we hear the thunder; and when it shakes out its plumage, the rain descends. Myths like this abound in the lore of many peoples, and the story of the mysterious bird is interwoven with the traditions which tell of their origin. A creature which has sufficient power to guide and rule a race is constantly embodied in its songs, its art, and its philosophy. Thus, highly regarded by the modern tribes, it must have been equally an object of consideration among

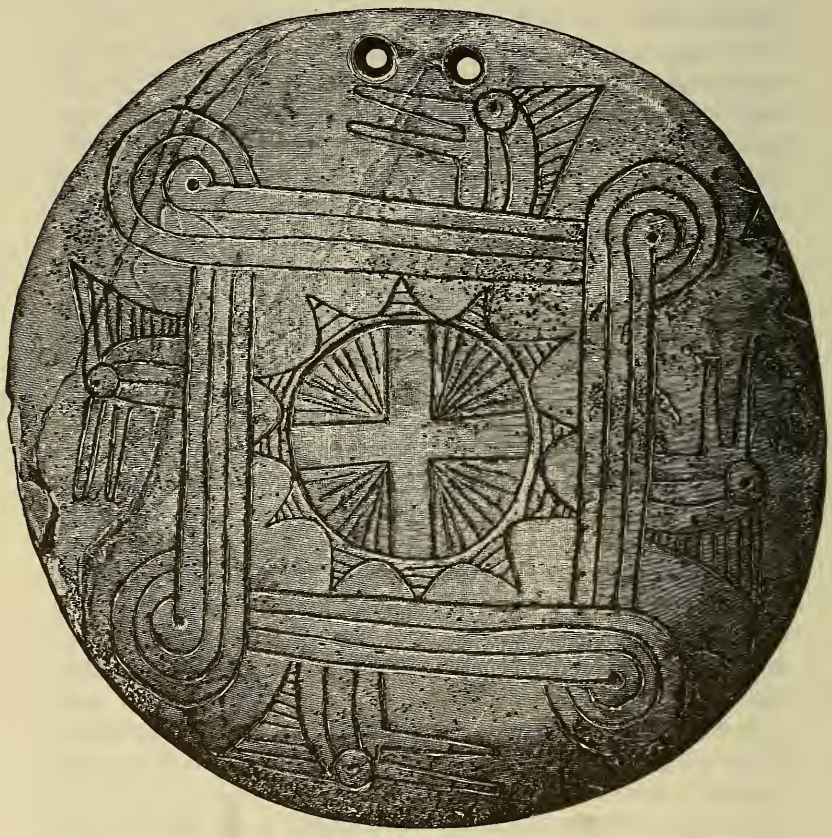

FIG. 2.

Shell gorget from Mississippi.

prehistoric races. We know that the Natchez and the Creeks included the bird among their deities, and by the relics placed within their sepulchers we know that it held an important place in the esteem of the mound-builder.

One of the most interesting of all these ancient relics is the gorget presented in Fig. 2.

The design, which is clearly and symmetrically drawn, evinces a master hand. It would seem to embody one of those charming myths of the heavens, the sun, and the firmament, guarded by four mystic birds, the rulers of the winds. I am perfectly well aware that imaginative writing is not in keeping with scientific investigation, but when it is remembered that the myths of the American aborigines are highly poetical and abound in lofty rhetorical figures, there can be no good reason why their art should not echo these rhythmical passages of the imagination. For one, I have not the least doubt that the design in question embodies in its almost unintelligible symbols the chief features of a well-developed myth. To the thoughtful mind it will certainly be apparent that every line of this design is significant, not necessarily full of symbols of an occult nature; but, along with the songs and traditions of a departed race, this work had a place among the highest flights of their fancy, if not in the most important tenets of their philosophy. Yet, concerning these very works one writer has ventured the opinion that "they do but express the individual fancy of those by whom they were made;" that they are even without "indications of any intelligent design or pictographic idea." I do not assume to interpret these designs: they are not to be interpreted. Besides, there is no advantage to be gained by an interpretation. We have many myths and systems of belief within our easy reach that are as interesting and instructive as these could be. All I desire is to elevate these works from the category of trinkets to what I believe to be their rightful place, the serious art of a people with great capacity for loftier works. What the gorgets themselves were, or what particular value they had to their possessors, aside from simple ornament, must be, in a measure, a matter of conjecture. They were hardly less than the totems of clans, the insignia of rulers, or the potent charms of a priesthood. The design has in this case been engraved upon the convex side, the concave surface being plain. The perforations are placed near the margin, and are considerably worn by the cord of suspension. In the center is a nearly symmetrical cross, of the Greek type, in-

closed in a circle one and one-fourth inches in diameter. The spaces between the arms are emblazoned with groups of radiating lines. Placed at regular intervals on the outside of the circle are twelve pointed pyramidal rays ornamented with transverse lines. The whole design presents a remarkable combination of the two symbols—the cross and the sun. Surrounding this interesting symbol is another of a somewhat mysterious nature. A square framework of four continuous parallel lines symmetrically looped at the corners incloses the central symbol, the inner line touching the tips of the pyramidal rays. Outside of this again are the four symbolic birds placed against the sides of the square opposite the arms of the cross. These birds, or rather birds' heads, are carefully drawn after what, to the artist, must have been a well-recognized model. The mouth is open and the mandibles long, slender, and straight. The eye is represented by a circlet, which incloses a small conical pit intended to represent the iris; a striated and pointed crest springs from the back of the head and neck, and two lines extend from the eye, down the neck, to the base of the figure. In seeking an original for this bird, we find that it has perhaps more points of resemblance to the ivory-billed woodpecker than to any other species. It is not impossible, however, that the heron or swan may have been intended. That some particular bird served as a model is attested by the fact that other specimens from mounds in various parts of Tennessee exhibit similar designs. I have been able to find six of these specimens, all of which vary to some extent from the type described, but only in detail, workmanship, or finish.

The Serpent.—The serpent has had a fascination for primitive man hardly surpassed by its reputed power over the animals on which it preys. In the minds of nearly all savages it has been associated with the deepest mysteries and the most potent powers of nature. No other creature has figured so prominently in the religious systems of the world, few of which are free from it; and, as art in a great measure owes its existence to an attempt to represent or embellish objects which are supposed to be the incarnations of spirits, the serpent is an important element in all art. Wherever the children of nature have wandered, its image may be found engraved upon the rocks, or painted or sculptured upon monuments of their own construction. It is found in a thousand forms. Beginning with those so realistic that the species can be determined, we may pass down through innumerable stages of variation until all sem-

blance of nature is lost. So well is the serpent known as a religious symbol among the American peoples, that it seems hardly necessary to present illustrations of the curiously interesting myths relating to it. We are not surprised to find the bird, the wolf, or the bear placed among representatives of the "Great Spirit," and hence to find them embodied in art; but it would be a matter of surprise if the serpent were ever absent.

With the mound-builders it seems to have been of as much importance as to other divisions of the red race, ancient or modern. It is of very frequent occurrence among the designs engraved upon gorgets of shell, a multitude of which have been thus dedicated to the serpent-god.

It is a well-known fact that the rattlesnake is the species universally represented, and these engravings on shell present no exception to this rule. From a very early date in mound exploration these gorgets have been brought to light, but the coiled serpent engraved upon their concave surfaces is so highly conventionalized that it was not at once recognized. Professor Wyman appears to have been the first to point out the fact that the rattlesnake was represented; others have since made brief allusion to this fact. Two examples only have been illustrated: one by Professor Jones, who regards it as being without intelligent design, and the other by Dr. Rau, who does not suggest an interpretation. Among the thirty or forty specimens that I have examined the engraving of the serpent is placed, with one exception, upon the concave side of the disk, which, as usual, is cut from the most distended part of the *Busycon perversum*, or some similar shell. The great uniformity of these designs is a matter of much surprise. At the same time, however, there is no exact duplication: there are always differences in position, detail, or number of parts. The serpent is always coiled, the head occupying the center of the disk. With a very few exceptions the coil is sinistral. The head is so placed that when the gorget is suspended it has an erect position, the mouth opening toward the right hand.

It is a remarkable fact that two species appear to be represented, one being the common yellow rattlesnake (*Crotalus horridus*) of the Atlantic slope, the characteristic markings of which are alternating light and dark chevrons, Fig. 3; while the diamond rattlesnake (*Crotalus adamanteus*) of the Southern States, probably served as a model for the other group, Fig. 4.

As at first glance it will be somewhat difficult to make out clearly the figure of the serpent, even with the well-defined lines of the drawing before us, I will present the description pretty much in the order in which the design revealed itself to me in my first attempt to decipher it.

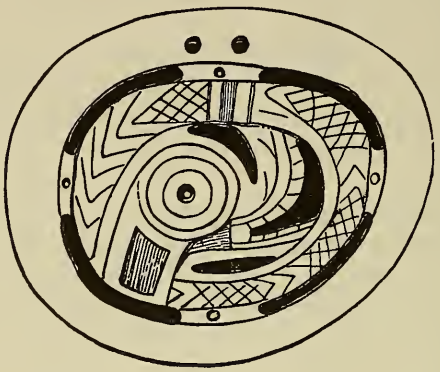

Fig. 3.

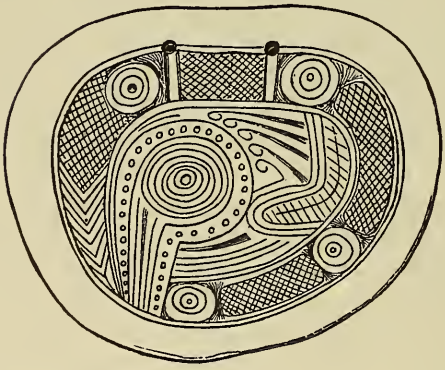

Fig. 4.

Shell gorgets with serpent design from a mound at Sevierville, Tennessee.

The saucer-like disks are almost circular, the upper edge being mostly somewhat straightened, the result of the natural limit of the body of the shell above. All are ground down to a fairly uniform thickness of from one-eighth to one-fourth of an inch. The edges are evenly rounded and smooth. Two small holes for suspension

occur near the rim of the straighter edge, and generally on or near the outline of the engraved design, which covers the middle portion of the plate. The diameter ranges from one to six inches.

To one who examines this design for the first time it seems a most inexplicable puzzle—a meaningless grouping of curved and straight lines, dots, and perforations. We soon notice, however, a remarkable similarity in the designs, the idea being radically the same in all specimens, and the conclusion is reached that there is nothing haphazard in the arrangement of the parts, and that every line must have its place and purpose. The design is in all cases inclosed by two parallel border lines, leaving a plain belt from one-fourth to three-fourths of an inch in width around the edge of the disk. All simple lines are firmly traced although somewhat "scratchy," and they are seldom more than one-twentieth of an inch in width or depth.

In studying the design, the attention is first attracted by an eye-like figure near the left border. This is formed of a series of concentric circles, the number of which varies from three in the most simple to twelve in the more elaborate forms. The diameter of the outer circle of this figure varies from half an inch to an inch. In the center there is generally a small conical pit. The series of circles is partially inclosed by a looped band one-eighth of an inch in width, which opens downward to the left, the free ends extending outward to the border line, gradually nearing each other, and forming a kind of neck to the circular figure. This band is in most cases occupied by a series of dots or conical depressions varying in number from two to thirty. The neck is decorated in a variety of ways: by dots, by straight and curved lines, and by a cross-hatching that gives a semblance of scales. A curious group of lines occupying a cresent shaped space at the right of the circular figure and inclosed by two border lines, must receive particular attention. This is really the front part of the head—the jaws and the muzzle of the creature represented. The mouth is always clearly defined and is mostly in profile, the upper jaw being turned abruptly upward; but, in some examples, an attempt has been made to represent a front view, in which case it presents a wide V-shaped figure. It is, in most cases, furnished with two rows of teeth, no attempt having been made to represent a tongue. The spaces above and below the jaws are filled with lines and figures which vary much in the different specimens; a group of plume-like figures extends back-

ward from the upper jaw to the crown, or otherwise this space is occupied by an elongated perforation. The body is represented as encircling the head in a single coil, which appears from beneath the neck on the right, passes around the front of the head, and terminates at the back in a pointed tail with well-defined rattles. It is engraved to represent the well-known scales and spots of the rattlesnake, the conventionalized figures being quite graphic.

Fig. 5.

Shell gorget with spider design from a mound in St. Clair county, Illinois.

The Spider.—Among insects the spider is best calculated to attract the attention of the savage. The curiously constructed houses of some varieties and the marvelous web of others must elicit the admiration of all beholders. It is certainly not strange that the spider appears in the myths of savages, yet it occurs but rarely in aboriginal art. Four examples engraved upon shell gorgets have come to my notice. The very fine specimen illustrated in Fig. 5 was obtained from a mound in St. Clair county, Illinois. It was found on the breast of a skeleton, and was very much discolored and quite fragile from decay; but no part of the design, which was engraved upon the concave side, has been obliterated. Near the margin and parallel with it three lines have been

engraved. The spider is drawn with considerable fidelity to nature, and covers nearly the entire disk—the legs, mandibles, and abdomen reaching the outer marginal line.

The thorax is placed in the center of the disk, and is represented by a circle, within which a cross has been engraved. The ends of the four arms have been enlarged on one side, producing a form much used in heraldry, but one very rarely met with in aboriginal American art. The head is somewhat heart-shaped, and is armed with palpi and mandibles, the latter being ornamented with a zigzag line and prolonged to the marginal lines of the disk. The eyes are represented by two small circles with central dots. The legs are correctly placed in four pairs upon the thorax, and are very graphically drawn. The abdomen is large and somewhat heart-shaped, and is ornamented with a number of lines and dots which represent the natural markings of the spider. The perforations for suspension are placed near the posterior extremity of the abdomen.

A gorget having a similar design was obtained from a mound on Fain's Island, Tennessee. The insect has been somewhat more highly conventionalized, but the general effect is very similar to that of the Illinois specimens.*

The Human Face.—A very important group of shell ornaments represent the human face more or less distinctly. By a combination of engraving and sculpture a rude resemblance to the features is produced. These objects are generally made from pear-shaped sections of the lower whorl of large marine univalves. The lower portion, which represents the neck and chin, is cut from the somewhat restricted part near the base of the shell; while the broad outline of the head reaches the first suture or the noded shoulder of the body whorl. The features are carved upon the convex surface. In the simpler forms the nose is represented by a low vertical ridge, no other features being indicated. Others have rings or perforations for eyes and rude indentations for the mouth, while the more elaborate examples have a variety of lines cut upon the cheeks or chin.

Fig. 6 represents a specimen from the Brakebill Mound, East Tennessee. The mouth is not indicated and the nose is but slightly

* Detailed descriptions of these objects will be given in the Second Annual Report of the Bureau of Ethnology.

relieved. Each eye, however, is inclosed by a figure which extends downward over the cheek, terminating in three sharp points.

FIG. 6.

Mask-like shell ornament from East Tennessee.

FIG. 7.

Mask-like shell ornament from Virginia.

Fig. 7 represents a fine example of these objects said to have been obtained on Acquia Creek, Va. It is unusally well preserved and is five and one-half inches in length by five in width. The outline is somewhat rectangular, the upper margin being pretty well rounded, and ornamented with a corona of incised lines, which are arranged in six groups of four each. Inside of these a single incised line runs parallel with the edge from temple to temple. The eyes are represented by circles with small central pits, and the lids, by long, pointed ellipses. From each of the eyes a group of three zigzag lines extends downward over the cheek, terminating near the edge of the plate opposite the mouth. The nose is represented by a flat ridge, which terminates abruptly below, the nostrils being indicated by two small excavations. In regard to the peculiar lines engraved upon these faces, I would suggest that, if they are burial masks, the zigzag lines from the eyes may stand for tears, but I incline to the opinion rather that they are delineations of the tattooing or painting of the clan to which the deceased belonged. It is probable that these objects were further embellished by painted designs.

These gorgets are especially numerous in the mounds of Tennessee, but their range is quite wide, examples having been reported from Kentucky, Virginia, Illinois, Missouri and Arkansas, and smaller ones of somewhat different types from New York and Louisiana. In size they range from two to ten inches in length, the width being considerably less. They are generally found associated with human remains in such a way as to suggest their use as ornaments for the head or neck. There are, however, no holes for suspension, except those made to represent the eyes; and these, so far as I have observed, show no abrasion by a cord of suspension.

The Human Figure.—I now come to a class of relics which are new and unique, and in more than one respect are the most important objects of aboriginal art yet found within the limits of the United States. Of these I shall describe four which come from that part of the mound-building district occupied at one time by the "stone-grave" peoples—three from Tennessee and one from Missouri. Similar designs are not found on other materials, and, indeed, nothing at all resembling them exists, so far as I know, either in stone or in clay. If such were painted or engraved on less enduring materials they are totally destroyed.

Fig. 8 represents a gorget on which is engraved a rather rude delineation of a human figure. The design occupies the concave side of a large shell disk cut from a *Busycon perversum*. Near the upper margin are the usual holes for suspension. The engraved

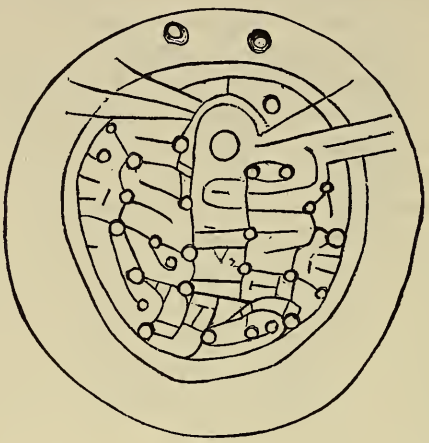

Fig. 8.

Shell gorget with rude human figure, from a mound at Sevierville, Tennessee.

design fills the central portion of the plate, and is inclosed by two approximately parallel lines, between which and the edge of the shell there is an annular space three-fourths of an inch wide. A casual observer would probably not recognize any design whatever in the jumble of half obliterated lines that occupies the inclosed space. It will first be noticed that a column about three-fourths of an inch in width stands erect in the center of the picture. From this spring a number of lines forming serpentine arms, which give the figure as much the appearance of an octopus crowded into a collector's alcohol jar as of a human creature. A little study will enable one, however, to recognize in the central column the human body, and in the tangle of lines surrounding it, the arms, legs, hands, feet, and their appendages—no line within the border being without its office. The upper extremity of the body is occupied by a circle one-eighth of an inch in diameter, which represents the eye. The head is not distinguished from the body by any sort of constriction for the neck, but has evidently been

crowned by a rude aurora-like crest similar to that found in so many aboriginal designs. The mouth is barely suggested by three shallow lines placed so low on the trunk that they occupy what should be the chest. From the side of the head a number of lines, probably meant for plumes, extend across the bordering lines almost to the edge of the shell. Below these are two perforated loops, which seem to take the place of ears; the one on the right is doubly perforated and has a peculiar extension, in a bent or elbowed line, across the border. The arms are attached to the sides of the body near the middle in a haphazard sort of way and are curiously double jointed; they terminate, however, in well-defined hands against the right and left borders, the thumb and fingers being, in each case, distinctly shown. The legs and feet are at first exceedingly hard to make out, but when once traced are as clear as need be. The body terminates abruptly below within an inch of the base of the inclosed space. One leg extends directly downward, the foot resting upon the border line; the other extends backward from the base of the trunk and rests against the border line at the right; the legs have identical markings, which probably represent the costume. Each foot terminates in a single well-defined talon or claw, which folds upward against the knee. This is a most interesting feature, and one which this design possesses in common with the three other drawings of the human figure found in Tennessee. The spaces between the various members of the figure are filled in with ornamental appendages, which seem to be attached to the hands and feet, and probably represent plumes. The numerous perforations in this specimen are worthy of attention: within the border line there are twenty-six, which vary from one-fourth to one-sixteenth of an inch in diameter. They are placed mostly at the joints of the figure or at the junction of two or more lines. Such perforations are of frequent occurrence in this class of gorgets, and may have had some particular significance to their possessors. This specimen was found in the great mound at Sevierville, Tenn., upon the breast of a skeleton, and is now in the National Collection. It has suffered considerably from decay, the surface being deeply furrowed, pitted, and discolored. The holes are much enlarged and the lines in places are almost obliterated.

I began the study of this design with the thought that, in reference to this specimen at least, Professor Jones was right, and that the confused group of lines might be the meaningless product of an

idle fancy, but ended by being fully satisfied that no single line or mark is without its place or its significance.

After having examined this design so critically it will be an easy matter to interpret that engraved upon the tablet illustrated in Fig. 9.

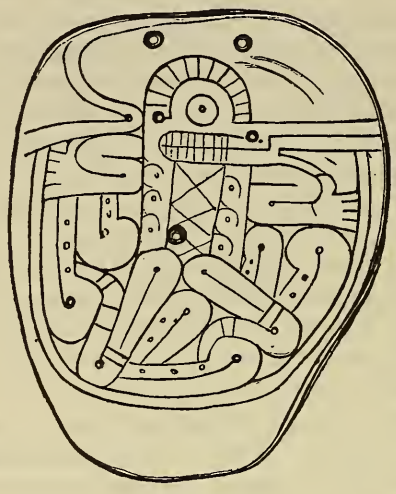

Fig. 9.

Shell gorget with human figure, from a mound, Meigs county, Tennessee.

Although found in widely separated localities and engraved in a somewhat different style they are identical in type, and exhibit but slight differences in detail. At the top of the plate we have the two doubly conical perforations for suspension, but the double border line is not completed above, being interrupted by the plumes from the head. The head itself is decorated with the usual crown of radiating lines, a small circle with a central pit represents the eye, and below this is a well-defined mouth with a double row of teeth. Extending to the right from the mouth is an appendage consisting of one straight and two interrupted lines, which may be a part of the costume, or, since it issues from the mouth, may possibly symbolize speech. The body, which is short and straight, is divided vertically into three parts; the central space contains a large conical perforation, and is covered with a lace-work of lines; the lateral spaces are ornamented with rows of buttons or scales,

which consist of meagerly outlined circles with central dots. The curiously folded arms have precisely the same relative positions as the corresponding members in the other specimen, and the fingers touch the bordering line on the right and left, the thumb being turned backward against the elbow. The legs are represented in a manner that suggests a sitting posture, the rounded knees coming in front of and joining the base of the body; in position and decoration they repeat the other specimen. The feet, or the rounded extremities that represent them, rest upon the border lines, as in the case previously described, and terminate in upturned talons that are long, curved, and jointed, and have square or blunt tips. Plume-like appendages are attached to the arms and legs, and fill the spaces not occupied by the members of the body; these plumes or pendants are always represented by folded bands or fillets which are ornamented on one side with dots. A plume attached to the left side of the head is represented by two curved lines, which reach to the edge of the shell. There are five perforations, two for suspension, two at the sides of the face, and one near the middle of the trunk. This specimen is in a very perfect state of preservation, the surface being smooth and but little stained. It is somewhat pear-shaped, resembling in this respect the mask-like gorgets previously described. It is about seven inches in height and five in width, and has been made from a very thick and compact shell—probably a *Busycon*. It was obtained from a mound in Meigs county, Tennessee, and is preserved in the Peabody Museum. In mechanical execution this specimen is much superior to the preceding one; the edges and surface of the shell are nicely dressed, although the lines of the design are indifferently cut.

Another unique shell gorget is presented in Fig. 10. It was obtained from a mound in Southeastern Missouri, and is now in the possession of Professor Potter, of St. Louis. The disk is about four and a half inches in diameter, and was originally nearly circular, but the edges are now much decayed and battered. A cut with a brief description is given by Mr. A. J. Conant in his recent work "Footprints of Vanished Races," page 95. My cut is made from a photograph obtained from Professor Putnam, of the Peabody Museum. This is probably the same photograph used by Mr. Conant. The engraved design is of a totally distinct type from the last, and evinces a much higher grade of skill in the artist. It is encircled by six nearly parallel lines, which occupy about half an

inch of the border of the disk. Portions of these still remain, the inner one being nearly perfect. Between this and the second line are two perforations for suspension. The idea first suggested by a glance at the engraved design is that it strongly resembles the work of the ancient Mexicans, and the second idea of many archæologists will probably be that there may be a doubt of its genuineness. Setting this question aside for the present, let us examine the engraving in detail. Placing the plate so that the two

FIG. 10.

Shell gorget with human figure, from a mound in Southeast Missouri.

perforations are at the left we have the principal figure in an upright posture. This figure apparently represents a personage of some importance, as he is decked from head to foot with a profusion of ornaments and symbols. He is shown in profile with the arms extended in action and the feet separated as if in the act of stepping forward. The head is large, occupying about one-third of the height of the design. The elaborate head-dress fills the upper part of the inclosed space, pendant plumes descend to the shoulders before and behind, and circular ornaments are attached to the hair and the ear. The conventionalized eye is lozenge or diamond shaped, with a small conical pit for the pupil.

The profile shows a full forehead, a strong nose, and a promi-

nent chin. Two lines extend across the cheek from the bridge of the nose to the base of the ear. In and projecting from the mouth is a symbolic figure, the meaning of which can only be conjectured. The shoulders and body are but meagerly represented. From the waist a peculiar apron-like object is suspended, which reaches to the knees. The legs and feet are dwarfed, but quite well outlined. There are encircling bands at the knee and ankles, and a fan-like extension of the costume, somewhat resembling the tail of a bird, descends between the legs. Attached to the back, behind, is a figure of a rather extraordinary character. It is not unlike the contrivance seen upon the backs of some of the figures in Mexican paintings for carrying burdens, and in which, at times, elfish figures are accommodated. The right arm is extended forward, and the hand grasps a singular shaft, with which a blow is aimed at the severed head of the victim, which is held face downward by the left hand of the standing figure. The severed head still retains the plumed cap, from which a long pendant descends in front of the face. The eye is lozenge-shaped. A zigzag line crosses the cheek from the ear to the bridge of the nose, and a curious symbolic figure is represented as issuing from the mouth. The shaft held in the right hand seems to issue from a circular figure, doubtless of symbolic character, which occupies the space in front of the head of the standing figure. It is possible that the figure which issues from the mouth of the victim represents the point of this mystic shaft which has penetrated the head, although we should have to allow some inaccuracies in the drawing if this were the case. Any one at all familiar with the curious pictographic manuscripts of the ancient Mexicans will see at a glance that we have here a sacrificial scene, in which an officiating priest is engaged in the immolation of a human being. In the extraordinary manuscripts of the ancient Aztecs we have many parallels to this design. So closely does it approach the Aztec type that, although no duplicate can be found in any of the codices, there is not a single idea, a single member or ornament, that has not its analogue in the Mexican manuscripts. Fortunately for the credit of this Missouri relic there are no duplicates—there are only family resemblances; there are similar plumes, with similar ornaments and pendants; there are similar costume and attitudes; there are similar features and symbols: but there is no absolute identity, except in motive and conception.

Among the multitude of works of art collected within the last decade, very few will be found to surpass in interest the fragment of a shell gorget from the McMahon Mound, at Sevierville, Tenn. (Fig. 11.) The disk, when entire, was nearly five inches in diam-

Fig. 11.

Shell gorget with fighting figures, from a mound at Sevierville, Tennessee.

eter. A little more than one-third had crumbled away, and the remaining portion was preserved only by the most careful handling and by immediate immersion in a thin solution of glue. This specimen is the first of the kind ever brought to light in this country, and must certainly be regarded as the best example of aboriginal art ever found north of Mexico. The design, as in the other cases, is engraved on the convex surface of a polished shell disk, and represents two human figures, plumed and winged, with eagles' talons for feet, and engaged in mortal combat. As in the last specimen described, this has at first sight an exotic look, bearing certainly in its conception a general resemblance to the marvelous bas-reliefs of Mexico and Central America; but the resemblance goes no further, and we are at liberty to consider it a northern work *sui generis*. The design has apparently covered the entire tablet, leaving no space for encircling lines. The two figures are in profile, and face each other in a fierce onset. Of the right-hand figure only the body, one arm, and one leg remain, the dotted lines in the cut indicating the parts restored. The left-hand figure is almost

complete, the outline of the face, one arm, and one foot being obliterated. The right hand is raised above the head in the act of brandishing a long double-pointed knife. At the same time this doughty warrior seems to be receiving a blow in the face from the right hand of the other combatant, in which is clutched a savage-looking blade with a curved point. The hands are vigorously drawn, the joints are correctly placed, and the thumb presses down upon the outside of the forefinger in its natural effort to tighten and secure the grasp. Two bands encircle the wrists and probably represent bracelets. The arms and shoulders are plain. The head is decorated with a single plume, which springs from a circular ornament placed over the ear. An angular figure extends forward from the base of this plume, probably the remnant of the head-dress proper. Forward of this, on the very edge of the crumbling shell, is one-half of the lozenge-shaped eye, the dot intended to represent the pupil being almost obliterated. It is a misfortune that both faces are gone; their exact character must remain conjectural. A neat ornament is suspended upon the well-formed breast, and a broad belt encircles the waist, beneath which, covering the abdomen, is a design that suggests the scales of a coat of mail. The legs are well-defined and perfectly proportioned; the left knee is bent forward, and the foot is planted firmly on the ground, while the right is thrown gracefully back against the rim at the left. Double bands encircle the knees and ankles. The legs terminate in well-drawn eagles' feet, armed with vigorously curved talons. A very interesting feature of the design is the highly conventionalized wing, which is attached to the shoulder behind, and fills the space beneath the uplifted arm. A broad, many-feathered tail is spread out like a fan behind the legs. The right-hand figure, so far as seen, is an exact duplicate of the left. Between the figures a design of undetermined significance occupies the space beneath the crossed arms; it may represent drapery, but is more probably symbolic in its character. The heads were probably a little too large for good proportion, but the details of the anatomy are excellent. The muscles of the shoulder, the breast and nipple, the waist, the buttock, and the calves of the legs are in excellent drawing. The whole group is most graphically presented. A highly ideal design, it is made to fill a given space with a directness of execution and a unity of conception that is truly surprising.

Let us turn for a moment from this striking effort of the mound-

builders to the early efforts of other peoples in the engraver's art. Look at the drawings of the Troglodytes of France, scintillations of palæolithic genius which appear as a flash of light in the midst of a midnight sky. They are truly remarkable. The clear-cut lines that shadow forth the hairy mammoth suggest the graphic and forcible work of the Parisian of to-day. The rude Esquimaux of our own time engrave images of a great variety of natural objects on their ornaments and implements of ivory in a manner that commands our admiration. But these shell tablets have designs of a much higher grade. They not only represent natural objects with precision, but they delineate conceptions of mythical creatures of composite character for which nature affords no model. In execution the best of these tablets will not compare with the wonderful works in stucco and stone of Palenque, or the elaborate sculptures of the Aztecs; but they are, like them, vigorous in action and complete in conception.

And now we come to the question of the origin of these objects, and especially of the specimen most closely resembling Mexican work. The Conant gorget is in many respects quite isolated from all others hitherto found in the Mississippi Valley. Must it be regarded as an exotic, as an importation from the South, or does it belong to the soil from whch it was exhumed? In order to answer this question we must not only determine its relations to the art of Mexico, but we must know just what affinities it has to the art of the mound-builders.

In the first place, gorgets of shell are a marked characteristic of the personal embellishment of the northern peoples. They may have been in use among the Aztecs, but do not appear among southern antiquities, and no evidence can be derived from history. This gorget belongs, in its general character as an ornament, to the North. It is circular in form, it has two small perforations near the margin for suspension, and is made from the wall of a large univalve. The design occupies the central portion of the convex side of the disk, and is inclosed by a number of incised lines. In all of these features, together with its technical execution and its manner of inhumation, it is identical with the well-known work of the mound-builders. These analogies could hardly occur, if it were an exotic.

It is true, however, as we have already seen, that the design itself has a closer affinity to Mexican art than to that of the North.

It represents a sacrificial scene, and has many parallels in the paintings and sculpture of the South, whereas no such design is known in the art of any nation north of Mexico. The engravings of the mound-builders represent legendary creatures derived from the myths of the fathers, and in this respect have their parallels in the bird-man of the Haidahs, the war-god of the Zuñis, and the mythical deities of other countries; but they are never illustrative of the customs or ceremonies of the peoples themselves. As an ornament this Missouri gorget is a member of a a great family that is peculiarly northern, but the design engraved upon it affiliates with the art of Mexico. So close and striking are the resemblances, that accident cannot account for them, and we are forced to the conclusion that it must be the offspring of the same beliefs and customs and the same culture as the art of Mexico.

DISCUSSION.

Prof. MASON called attention to the striking similarity between the figures on the shell ornament shown in Fig. 10 and one of the bas-reliefs found in Guatemala by Habel.

President MALLERY remarked that, during his examinations of the copies of the Dakota Calendar first seen by him, he was induced to believe that there had been an attempt to be precise in the details, which, on examination of other copies, proved not to be the case. In some of the charts, the characters are drawn from a central position spirally from right to left to the outer margin of the material upon which they are depicted; in others, the spiral runs from left to right; while upon others, the symbols are drawn in serpentine curves or in straight lines. There were also variations in the several figures, though the idea expressed was always the same for the characters in corresponding order. The fact that, in the many copies of the scalloped disk exhibited by Mr. Holmes, the characters were absolutely identical, tended to show that they were not ordinary pictographs nor ideographs, which would admit of variations of execution, but that they formed a conventional design—perhaps, as suggested, a time-symbol, not admitting of any variants.

Dr. J. H. PORTER then read a paper on "CANNIBALISM."

ABSTRACT.

Cannibalism was probably at certain periods of development as

general as it is now exceptional. Existing as a custom, the practice exhibits itself under several distinct forms. How it became customary, that is to say, the question of primordialism, is waived, because an essential factor in the investigation, that relating to primitive ideas, could not be examined. Existing customs, however, are believed to be explicable according to the principles of sociological science. Cannibalism appears in several distinct forms, which are not necessarily successive stages of development, but which, starting from custom, have evolved into ceremonial observances of different orders. The unlimited anthropophagism of several districts of Africa is, so far as accessible evidence goes, determined neither by necessity, by fetichistic notions, nor by warlike or religious rites. It is not prevalent among the more degraded peoples, nor is it found in isolated and relatively undeveloped communities. Its continuance in societies among whom, in general, the practice is abhorred, and in a race exhibiting very great diversities of character and propensity towards variation, must be due to some cause sufficiently powerful to counterbalance the tendency to change involved in the conditions under which anthropophagy exists. This cause was assumed to be Fashion, and the hypothesis was shown to be conformable with the requirements of a *vera causa*, from the facts attaching to savagery at large, and from the *ensemble* of the negro's mental constitution. It was stated that the construction of a theory formed no part of the intention of the paper, which was merely a tentative towards the explanation of a social phenomenon that did not admit of explanation, either as a morbid appetite, however acquired, or as a superstitious rite or ceremonial observance of any other kind. The explanation suggested for its persistence was considered by the author to be sufficiently valid, from a scientific point of view, to justify the adoption of the hypothesis of Fashion as the cause of that particular form of cannibalism indicated.

DISCUSSION.

Dr. MORGAN stated that although the paper just read referred to African tribes, he desired to ask whether the North American Indians were ever known to have been cannibals.

President MALLERY replied that there were numerous instances on record, but thought that, if it occurred, the custom was referable to ritualistic observances.

Mr. HENSHAW, being called upon to state whether he had met with many instances of cannibalism in works on the North American Indians, replied that he had found no well authenticated cases.

Dr. MORGAN said he remembered reading in a history of Maryland (Alsop's) that the Susquehannocks were cannibals, and devoured victims.

Dr. FLETCHER called attention to a probably general prevalence of cannibalism at one time, and suggested that it might appropritely be considered as a fashion, or, perhaps, sheer love of good eating—epicurean cannibalism.

Colonel SEELY referred to the death of a notorious criminal in the south of Europe, who, in addition to other numerous crimes, had been found guilty of cannibalism, and who had remarked that human flesh was certainly sweet. This case might come under the same form spoken of by Dr. Fletcher, as illustrating a decided love of human flesh.

Mr. GILBERT considered it rather as the survival of a once universal custom, so that the question would not be in reference to the origin of cannibalism, but to the origin of the aversion to it.

President MALLERY said that the best authorities, or those upon whom we can place most reliance, do not refer to general anthropophagism, but state that certain pieces of the body or the heart are eaten, with the belief that the martial attributes of the victim are thus acquired by the one who partakes.

Mr. GATSCHET stated that the southern Oregonians took the heart out of the slain, and ate it for the purpose of obtaining the valor and fighting propensities of the victim. He suggested that, as many tribes arranged their hunts by forming a large circle and gradually concentrating so as to drive the game together, that it might more readily be killed, and as wars were considered "big hunts" only, so enemies were driven in a similar manner to one point, and the proceeds of the hunt eaten like game. The speaker further remarked that none of the southern tribes east of the Mississippi river, as the Cheroki, Cha'ta-Maskoki, and Timucua, and none of the eastern Algonkins and Panis had ever been charged with being cannibals. It is a mistake to judge Indian customs from our half moral, half sentimental point of view, since many customs are quite natural to Indian psychology which are repugnant to our feelings.

STONE IMPLEMENTS FROM NORTHWESTERN INDIA.

The following communication was received from Mr. Rivett-Carnac, Ghazipur, India, with a collection of stone implements from northwestern India:

During the past few years, Mr. J. Cockburn and myself have been fortunate enough to find stone implements in large quantities in Banda, a hilly district in the northwestern provinces of India. These implements consist chiefly of stone axes, or celts, of types well known in Europe. We have also found stone-hammers, ring-stones, and a variety of other implements, some of cosmopolitan types, and others unique.

The celts found are upwards of 400 in number and are of two distinct types, polished and chipped, the former of diorite, and the latter of basalt.

We are of opinion that both types were in use at the same time. Implements of true palæolithic types, made of quartzite, occur scantily in the Banda district, but are more numerous further south.

The celts vary from 12½ inches in length and 8 lbs. 3 oz. in weight, to 2½ inches in length and 3¾ oz. in weight.

The unique specimens of hammers, etc., and the largest and most remarkable of the celts have been presented by me to the British Museum. Sir P. Cunliffe-Owen, the well-known Director of the Kensington Museum, has, however, been good enough to cast the best specimens, and I hope later to send a complete series of colored fac-similes for your acceptance.

In the meantime, groups representing the classes of celts found have been made up for presentation to the principal museums and scientific societies of Europe and the United States, and I do myself the honor of intimating that a case containing celts, etc., has been sent to your address, in the hope that they may be considered of sufficient interest to find a place in your museum.

A few more specimens of spalls, or waste chips, flakes, and cores may be of value for comparison with similar objects from other countries. The chert was procured in nodules and bands in the Tirhowan limestone; the agate, from the beds of streams which cut through the Rewah conglomerate, south of Banda.

A larger collection of chert implements than any formerly made in India has been brought together by Mr. Cockburn, who will describe them more fully hereafter. The ethnic affinities of the collec-

tion are, he points out, curious. On one hand, the scrapers and knives are of European types, as are also the mass of the celts. Then there are certain types which clearly resemble Silices, hitherto only found in Egypt by Jukes Brown.*

A third type, apparently not common elsewhere (he designates them saw-backed knives) has recently been found in the Island of Melos. The coarser stone knives of quartz, sandstone, and basalt are not far removed from those used by the modern Australian savages.

The arrow-heads, as far as can be judged, come nearer the multitudinous American forms than any other; but the resemblance may rather be due to the comparatively large number of these implements which are known from America, and their comparative rarity in other countries. Some of the chert implements are of recent origin, and we have come to the conclusion that stone implements were probably in general use among the Kolairian, or Dravidian aborigines of this part of Bundelkhund, about 500 B. C., and that the use of stone among these people was not quite abandoned as late as 600 A. D.

A piece of sculpture representing an aboriginal armed with a stone axe, recently discovered at Kalinjar, is assigned to the seventh century after Christ. How far antecedent the use of stone may have been in this part of the country, no one will venture to guess, in the present state of our knowledge; but the majority of the implements have been found on the borders of the great Gangetic alluvial plain, itself of no great antiquity.

The alluvium in this part of Bundelkhund is largely made up of decomposed basaltic rocks, which crop up here and there to the very margin of the Jumna. No doubt this river has had much to do with the level and adjustment of this alluvium.

Some of the chert implements which are much weathered are, no doubt, of vast antiquity; but the evidence, so far as it has been sifted, is in favor of the theory that the people corresponding to the palæolithic men of Europe used excessively rude implements of jasper, quartzite, and basalt, rather than of chert, which was by no means abundant.

SIXTY-EIGHTH REGULAR MEETING, April 3d, 1883.

Colonel GARRICK MALLERY, President, in the chair.

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* Journal of the Anthropological Institute, Gr. Brit., Vol. VII.

The election of Mr. THORVALD SOLBERG, of the Library of Congress, as an active member; and Mr. ALTON HOWARD THOMPSON, of Topeka, Kansas, as corresponding member, was announced.

The Secretary reported, for the Curator, the gifts received since the last regular meeting:

From the AUTHOR.—A memorandum-description of the finer specimens of Indian earthenware pots in the collection of the Wyoming Historical and Geological Society, Wilkes Barre, Pennsylvania. By Harrison Wright. Forming publication No. 4. Wilkes Barre, 1883. 8vo. Seven heliotype plates of vessels.

From the SOCIETY.—Mémoires de la Société d'Histoire, d'Archéologie, et de Littérature de l'Arrondissement de Beaune, 1882.

Rev. J. OWEN DORSEY then read a paper entitled "DAKOTAN LEGENDS AND MYTHS."

ABSTRACT.

Some Omahas say that they have about three hundred myths. Of these, some are common to two or more tribes of the Dakotan or Siouan family. The following are found among the Omahas, Ponkas, and Dakotas: Ictinike's Adventures with the Turkeys, etc., (corresponding to the Dakotan myth of Uñktomi and the Geese, and the Kansas myth of the Man-in-the-Moon and the Turkeys;) The Creation of the Rabbit's Son out of Clotted Blood, (the Blood-Clot's Boy of the Dakota;) and the adventures of the Rabbit's Son with Ictinike, resulting in the death of the latter.

The following are common to the Omahas, Ponkas, and Otos: How the Rabbit killed the Black Bears; How the Rabbit overcame the Muskrat; How the Rabbit killed the Devouring Mountain; An Adventure of the Orphan as a Rabbit; How the Buzzard's Head was deprived of Feathers by Ictinike; and the Adventures of the Chief's Son with the Snake Woman and the Thunders. Parts of the last remind one of the story of the Fair Melusina, as given by Goethe.

The following are told by the Omahas, Kansas, and Osages: How the Rabbit killed the Devouring Mountain, (the Osages call him the Orphan;) The Coyote and the Buffaloes; and The Raccoons and the Crawfish.

Mythical explanations of phenomena were given. And then

followed the Omaha, Kansas, and Osage versions of the Raccoons and the Crawfish.

Prof. CYRUS THOMAS exhibited some tracings of pictographs from the pipe-stone quarry in Minnesota.

Prof. O. T. MASON then read a paper entitled "A YEAR IN ANTHROPOLOGY," in which the prosecution of anthropologic work was reported under the headings in accordance with the author's scheme, which had been presented at a previous meeting, and subsequently printed in the American Naturalist. The main divisions are I. Anthropogeny. II. Archæology. III. Anthropo-Biology. IV. Psychology. V. Glossology. VI. Ethnology. VII. Technology. VIII. Sociology. IX. Mythology. X. Hexiology. XI. Instrumentalities of anthropologic research.

Dr. FLETCHER read a letter from Sir Rawson Rawson, of London, Chairman of the Anthropometrical Commission of the British Association for the Advancement of Science, addressed to Colonel Baxter, U. S. A., upon a supposed relation of stature to degrees of latitude. The writer had taken the tables of stature, "by States," from the "Statistics of the Provost Marshal General's Bureau," and re-arranged them in the geographical order of the States, his theory being that mean stature diminishes with progress southward from a "temperate latitude." To a table of half a million of men of different nativities taken into the armies of the United States under the draft, he had also added columns showing the percentage of "extremes of proportion."

Dr. FLETCHER commented upon these tables and expressed his disbelief in any conclusions as drawn by Sir Rawson from the population of the United States, inasmuch as its mixed nativities and migratory habits rendered all such conclusions fallacious. It might be said, however, that there was a "tendency" to such an arrangement of stature by latitude as that proposed in the tables in question.

An animated discussion followed, in which Messrs. Blodget, Smiley, Thomas, Riley, and others participated.

Sixty-Ninth Regular Meeting, April 17th, 1883.

Col. Garrick Mallery, President, in the Chair.

The election of Mr. Gilbert Thompson, of the United States Geological Survey, and Prof. Alexander Graham Bell, to active membership, was announced. The death of Mr. John Green Mills was also announced.

GIFTS.

From Mr. Gatschet.—Stenographic report of the German Anthropological Society, XII Congress held at Regensburg, Aug. 8, 9, 10, 1881.

Professor Mason, on behalf of the Council, reported the election of the following named gentlemen as Corresponding Members:

By way of explanation, he remarked that the committee in charge of the matter had been greatly puzzled in making a distinction between the Honorary and the Corresponding list of Foreign Members. Their only guide had been the publications of these gentlemen, which had fallen into their hands at the Smithsonian Institution, the Surgeon General's Office, and the Bureau of Ethnology. It would be greatly preferable to unite the two lists. Those written as Corresponding Members were certainly highly esteemed, and those designated as Honorary would confer a great pleasure on our Society by correspondence.

Benedikt, Moriz, Coblenz, Rhine-Prussia.
Chavero, Señor Alfredo, Mexico, Mexico.
Dawkins, Prof. W. Boyd, Manchester, England.
Dawson, George, Montreal, Canada.
Ecker, Prof. A., Freiburg, Baden.
Faidherbe, Gen., Paris, France.
Fondouce, Paul Cazalis de, Montpellier, France.
Galton, Francis, London, England.
Gozzadini, Count Giovanni, Bologna, Italy.
Hartmann, Prof. Robert, Berlin, Prussia.
Von Hellwald, Fr., Stuttgart, Würtemburg.
Howitt, Alf. W., Gippsland, Victoria.

KEANE, AUGUSTUS H., London, England.
LEBON, Dr. GUSTAV, Paris, France.
MARTIN, HENRI, Paris, France.
MONTELIUS, Dr. OSCAR, Stockholm, Sweden.
NADAILLAC, Marquis de, Paris, France.
OROZCO Y BERRA, Don, Mexico, Mexico.
PINART, ALPHONSE, Panama.
RECLUS, ELISÈE, Paris, France.
STIEDA, Dr. LUDWIG, Dorpat, Russia.
TÖRÖK, Dr. AURÈLE DE, Buda-Pesth, Hungary.
WANKEL, Dr. A., Blansko, Moravia.
WHITMEE, Rev. S. J., Dublin, Ireland.
ZABOROWSKI-MOINDRON, Count, Paris, France.
TECHMER, O. F., Leipzig, Germany.

THE CARSON FOOTPRINTS.

The Secretary stated that, at a recent meeting of the California Academy of Sciences, Dr. H. W. Harkness, a member of the committee appointed during the summer of 1882 to examine and report upon the discovery of fossil foot-prints at Carson, Nevada, announced the result of still more careful examinations of the tracks since that time. His later observations fully confirmed his previous opinion that the tracks are those of a hitherto undescribed species of the *genus homo*, which he names *Homo nevadensis*, Harkness, basing the description solely upon the measurements of the impressions, length of steps, length of stride, the straddle, (or distance between the rights and lefts,) and the angle of deviation from median line. Dr. Harkness also presented the provisional name of *Canis carsonicus*, for the supposed new species of wolf, only the faint impressions of the foot-prints of which were discovered.

The Secretary expressed the opinion that no one was justified in presuming to describe new species upon such meagre evidence, and especially when the subject pertained to man.

Prof. MASON said he was glad to know that Dr. Harkness had coupled his own name with the "Nevada Man;" and thought it time that the scheme proposed by Mortillet was adopted, so that

all new discoveries or startling announcements would, in every instance, be coupled with their authors in a manner similar to that adopted in biologic nomenclature.

Dr. W. J. Hoffman then read a paper entitled "Comparison of Eskimo Pictographs with those of other American Aborigines."

For the graphic representation of ideas the various tribes of North American Indians have recourse to different materials upon which to display artistic skill. These substances are not entirely the result of choice, but the selection of specific varieties may frequently be due to the scarcity of more desirable ones. That area of the United States formerly occupied by the several tribes constituting the Algonkian linguistic stock, abounds in rock carvings and records, a characteristic type and style of etching prevailing throughout, by which means the former extent of the distribution of that stock can at present be recognized. The southwestern region comprising New Mexico, Arizona, southern Colorado, Utah, Nevada, and California, also contains numerous remains of this kind, especially upon the walls of the numerous "dry washes" and cañons. The Ojibwa resorted to birch bark upon which to depict their mnemonic records and personal exploits. The Indians of the plains generally use the dressed skins and robes of buffalo, while on the northwest coast, and in Alaska, ivory and wood are employed. These are the prevailing substances, deviations frequently occurring to suit the fancy of the artist or recorder.

Rock carvings are generally found more or less abundant in regions occupied by sedentary tribes; while among the hunting tribes of the prairies, materials permitting of easy transportation are used almost exclusively.

Upon both the eastern and western slopes of the Sierra Nevada, in southern California, pictographs of elaborate design, and covering large areas of rock surface, have been found; but none of them have yet been shown to be the work of any specific tribe. During the course of my investigations in California in the summer of 1882, under the auspices of the Bureau of Ethnology, I had occasion to visit some Indians at Tule River Agency, located near the head waters of the South Fork of Tulare river, where a pictographic record was discovered which had caused considerable speculation among the few persons who had observed it. The Indians who at present occupy that region are of the Yokuts linguistic stock, and,

according to their traditions, have resided in that country for at least a century. Their ancestors were ignorant of the authors of the pictographs, and had no idea of their import.

The valley is very narrow, less than a quarter of a mile in width, and is hemmed in by high mountains on both sides. The region is full of immense bowlders, which have rolled down from the mountain slopes whence they became detached during the lapse of ages. An immense granite mass, measuring about thirty feet in length, twenty feet in height, and from twelve to fifteen feet through, is so broken that one of the lower quarters has slid from under the larger mass, so as to leave a passage way through the entire diameter, forming a sort of square chamber eight feet high and of about equal width. This passage runs in a northwest and southeast direction. The west wall of the chamber—that facing the east—has evidently been selected for its special fitness to receive the pictograph, as will be observed farther on. (Fig. 1.)

The drawings appear to have been pecked in outline with a piece of quartz or other material of similar hardness, the lines varying from a mere rugose surface to grooves one-third of an inch in depth. Where the greatest depth was attained, the coloring matter has been best preserved.

Four colors were employed in this work: black, Naples yellow, white, and red ochre. Judging from customs still in vogue, the black was probably produced by mixing finely powdered charcoal or soot with clay. The yellow and red colors are undoubtedly compounds of iron, as traces of this mineral in ochreous forms are visible in various places throughout the valley. The white pigment seems to be an infusorial earth. Upon a small, rounded bowlder at one end of the chamber are several cup-shaped depressions, which served as mortars for grinding and preparing the colors for use. Traces of color still remain; and a thin, glazed surface appeared, which turned the point of a blade, upon my attempting its removal for analysis. Glue is prepared by the Indians at this day from the hoofs of antelope or deer, and also from the tail of the beaver. That the latter animal frequented this region at one time is evident from the representation of it upon the ceiling of the chamber. Pigments are mixed in a thin solution of glue, for the purpose of causing them to adhere more securely to the surface to which they are applied.

In the present instance it appears that the drawings, after having

been outlined, received a coating of color, which may have been hammered or rubbed with a sharp stone. The slight, almost invisible fissures in the partly fractured crystals composing the rock show that the coloring matter had penetrated below the natural surface.

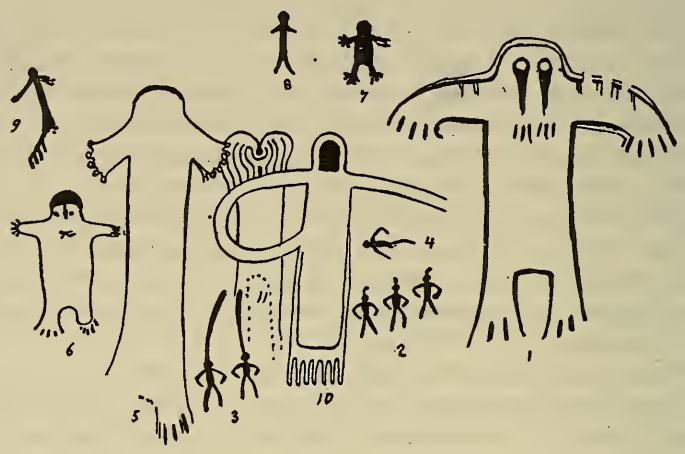

Fig. 1. Pictograph on a granite bowlder, on the South Fork of Tulare river, Cal.

As a rock painting, this example is the finest yet reported from this country; and the attempt at reproducing gestures of an almost universal frequency is also unique, considering the material upon which the record was made. The following interpretation is submitted, first, of the individual characters; and, second, of the information which the entire group appears to convey, and for which it was evidently intended.

No. 1 represents a person weeping. The arms and hands terminating in pendent fingers represent a common Indian gesture for *rain;* the lines drawn from the eyes downward to the breasts signify *tears, weeping;* a short distance below each line are three short lines, probably indicating the downward movement of the hands with pendent fingers past the face, as the common gesture for *tears, weeping,* is made, literally signifying, in gesture parlance, *eye-rain.* It is evident that the recorder intended to convey the idea that sorrow was felt by the person drawn, on account of the sufferings of others of the tribe shown in connection herewith.

Nos. 2, 3, and 4 are six individuals of different degrees of social status, as shown by the varying length of the warriors' plumes,

each of whom is represented in the act of making the sign for *hunger*, by passing the hands toward and backward from the sides of the body, denoting a "gnawing sensation," as expressed by the Indians. No. 4 probably denotes one who has already died of starvation, as he also makes the gesture for *hunger*, and is drawn in a horizontal position, a custom of indicating a dead man also found to exist among some of the Algonkins, especially the Blackfeet and Ojibwa.

Nos. 5, 6, 7, 8, and 9 are shown as making the sign for *negation*, a natural and almost universal gesture made by throwing one or both hands horizontally outward from the body toward the right and left. The fingers are extended, and, to make the gesture more emphatic, it almost appears as if the artist had drawn the toes similarly separated, as shown in Nos. 5, 6, and 7. The ornaments on the legs in No. 9 probably are meant for the trimmings upon the leggings.

No. 10, with the right hand and arm brought to the body, to indicate *self*, and the left extended to indicate direction, *to go*, signifies that the group contemplate going away. Now, since, as before stated, the face of the rock upon which the pictograph occurs runs northwest and southeast, the extended arm, pointing in the former direction, indicates that the course to be taken is that way. This belief is strengthened by the fact that bowlders having equally good surfaces for such a record are abundant, though no others were found of which the direction was suitable for showing the course to be taken, which it appeared necessary to do in this figure.

No. 11 is an ornamented head, with body and legs having an indefinite termination. The only interpretation that can be offered is that it represents a Shaman.

The above pictograph covers an area measuring about eight feet in height, and between twelve and fifteen feet in length, the latter being the transverse diameter of the bowlder. The largest figure, No. 1, is about six feet in length, the remaining figures are in proportion, as represented in the illustration.

Similar rock pictures are said to occur about fifteen or twenty miles northwest of this locality, and at a point about ten miles northeast; though I had no opportunity to personally examine their appearance and condition, or to note whether there was any relationship existing between all of them as to general import and artistic design.

It appears from a study of this pictograph that the people who made it had come to this locality as the advance party of a tribe in search of a better country, and, after a residence of an indefinite period, found that the subsistence necessary for the support of their tribe was not to be obtained. The record also appears as a notice to their successors to hasten their travels in the direction indicated toward the northwest.

That game and vegetable food were not in sufficient abundance is inferred from the elaborate representation of various plants, insects, and birds, upon the ceiling of the chamber, all directed towards the pictograph upon the side wall. Between the two series are a bald eagle and a beaver, accurately drawn, both transversely, and apparently heading off the other objects, the eagle before the birds and small animals, and the beaver in front of the plants and insects.

To further illustrate the reproduction of gestures in pictographs, I shall present a few examples taken from specimens in the museum of the Alaskan Commercial Co., of San Francisco, California, and from drawings prepared by an Alaskan Indian whom I met in that city during the summer of 1882. The latter are in imitation of drawings made upon wooden slats, to give notice of departure from home. The strip of wood upon which the figures are drawn is placed at the door, or upon the roof, and so secured that one end inclines in the direction taken by the maker, who is also the occupant of the dwelling. (Fig. 2.)

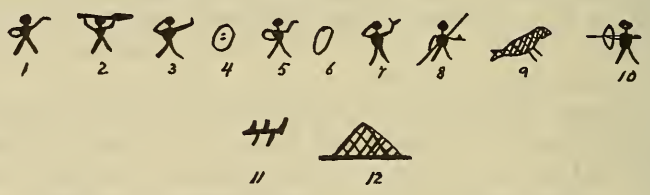

Fig. 2. Innuit drawing on wood; two-thirds natural size.

No. 1. The speaker, with his right hand indicating *himself*, and with his left pointing in the direction to be taken.

No. 2. Holding a boat paddle, signifying that he is going by boat.

No. 3. The right hand placed to the side of the head to denote *sleep*, and the left, with one finger elevated, to signify *one*, viz: one night.

No. 4. The island where he proposes to spend one night. The central spots denote habitations.

No. 5. Repetition of No. 1.

No. 6. Another island, apparently uninhabited.

No. 7. Repetition of No. 3, with the addition of having two fingers elevated to show that he intends to rest two nights.

No. 8. The recorder with his harpoon, making the gesture for sea lion with the left hand. (This sign is made by placing the flat hand edgewise, with the thumb extended and elevated, then pushed outward and downward in a slight curve.)

No. 9. A sea lion.

No. 10. Shooting with a bow and arrow.

No. 11. A canoe with two persons, the lower projections representing the oars. This signifies that after the object of the journey has been attained, he will return.

No. 12. The recorder's house toward which his boat is directed.

This interpretation was also given to me in gesture language, as well as in the Ki'ate'χamut dialect of the Innuit language, of which the following is the text, with literal translation:

Hui	ta-wa'-ut	ai-wi'-χa-na
I	there [to that place]	go [by boat]
kui-gi'-qta-mŭn,		a-χi-lu'-muk
that island,		one
ka-wa'-χa-lu'-a,	tca-li'	hui
sleep [night] there,	then	I
ai-wi'-lu-a		a-χa-mŭn
go		(to) another
kui-gi'-qta-mŭn,		ta-wa'-ni
that island,		there
ma-lu'-qnŭk		ka-wa-χa-lu'-a,
two		sleeps [nights],
hui	pĭ-qlu-a	a-χĭ-lu'-mŭk
I	catch	one
wi-ha'-mŭk'	tca-li'	a-ni-χlu'-a
sea lion	then	return
nu'-nan		m'nun.
[to] place		mine.

In the above text, as well as in others herewith submitted, *c* represents the sound of *sh; χ* the sound of *ch*, in the German word *ach*, *nacht;* and *q* the sound of *j* in Spanish *mujer*. Vowels have continental pronunciation.

Another example, obtained under similar circumstances to the preceding, further illustrates the drawing of gestures. (Fig. 3.)

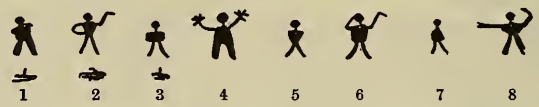

Fig. 3. Innuit drawing on wood; two-thirds natural size.

Nos. 1, 3, 5, 7 represent the same person addressed. His being armless evidently shows his passive state in the record.

No. 2 indicates the speaker, his right hand being placed against his body to denote *self, I;* the left hand is raised and points in the direction he is to take.

No. 4. The elevation of both hands with fingers and thumbs extended and separated, denotes *many*, according to my informant. It might as well signify *ten*; but the increased size of the hand is evidently intended as a superlative, as this method was adopted by the ancient Mexicans to denote plurality, and also appears to exist among the Ojibwa to signify *increased* quantity.

No. 6. The right hand placed to the head denotes *sleep*. Nos. 4 and 6 indicate, therefore, *many sleeps*, or, in other words, many days and nights. The left hand is directed downward and outward, meaning *at that place*, which he proposes to visit or has visited.

No. 8. The right hand is directed toward the starting point; while the left arm is brought inward, pointing over the head, to signify that he intends *to come back* to the place indicated.

The above may be summed thus: I am going away to remain many days; after which I shall return. The following is the Kiate-χamet text, with literal translations:

Hui	a-qtei′kua	a-χla′mŭn
I	go	(to) another
nu-na′-mŭn		am-lic′-ka-mŭ′-ik
settlement		many

ha-wa′-χa-lu-a	ta-wa′-nĭ	tca-lĭ′	hui
sleeps	there	then	I

a-ni-glu′-a.
return.

The accompanying illustration represents one method of notifying passing friends of the destitute condition of the occupants of a lodge. (Fig. 4.) The drawing is made on the smooth surface of a strip of wood; the lower end is stuck in the ground at a conspicuous point in the road or trail, so that the top points toward the house.

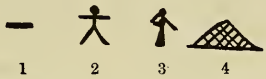

Fig. 4. Innuit drawing on wood; one-half natural size.

No. 1. Denotes the baidarka, or skin canoe, showing the recorder to be a fisherman.

No. 2. Is an individual with both hands thrown outward from the body, corresponding to the common gesture for *negation, nothing.* This is similar to the characters upon the Californian pictograph.

No. 3. Another human figure with one hand placed to the mouth, signifying *to eat,* the left being directed to—

No. 4. The habitation. The whole signifies that there is *nothing to eat in that house.*

The representation of the gesture for *negation, nothing,* as here given, is similar to Nos. 5, 6, 7, 8, and 9 of the Californian pictograph above mentioned.

In representing a person *dead* or *killed,* the style of drawing by the Alaskans is very similar to that of the Ojibwa. Frequently, as in some rock carvings attributed to the Blackfeet, we observe simply a horizontal line for either idea; if the person has been *killed,* the manner in which death was caused is generally represented, as by the bow and arrow, the spear, or by decapitation after being wounded. Headless bodies are found in many of the carvings from Alaska, and also upon the bark scrolls of the Ojibwa, a figure in the latter condition being represented in the accompanying sketch of a record taken from an Ojibwa pipe stem. (Fig. 5.) I venture to submit an interpretation, based upon a knowledge of

most of the characters obtained at various times and of which the signification is known.

Fig. 5. Ojibwa record on pipestem; one-half nat. size.

The topmost figure is a bear, colored blue in the original, and probably relates to the *gens* of which the recorder, or subject of the record, is a member. A heart drawn above the line extending backward from the mouth usually indicates bravery, and it is presumed that three hearts in the present instance imply provocation or anger.

The second figure, consisting of a circle, perhaps a shield, upon which is drawn a triradiate character, has reference to the personal totem of the individual. The central figure resembles, to some extent, a character frequently met with to signify stars, though in that case the lines connect the small discs and do not concentrate at any given point, as in the present instance.

The seven angular characters represent the lodges of the village where the recorder lived, and immediately beneath them is shown a waving band from left to right, signifying that the village was located near a river.

Beneath this are two persons, each grasping a gun with the left hand, and a third holding a spear, all of whom are members of the tortoise gens, as shown by the representation of that reptile in the same space. The upward curve, extending from side to side, is the sky; and the rayed circle immediately below the left extremity signifies that the sun was at that point of the sky when the fact narrated occurred. This interpretation is based upon the custom common to almost all tribes of facing the south when making the several gestures for day, or the different periods of a day, and beginning with the right hand at the eastern, or *left hand* side. Even when the points of the compass are not observed the gesture is always made from the left to the right. Hence it is to be inferred that the pictograph refers to early morning. The headless character below the sun

denotes the victim, who was a woman, as is shown by the skirt. The figure of a crane shows that she belonged to the crane gens. In the next figure of a bear, the hearts are beneath the line connected with the mouth, signifying sorrow. The reversed position also seems to denote that the perpetrator of the deed experienced remorse, and offered the sacred pipe, the last figure, to appease the wrath of the Great Spirit.

From the above it is evident that a warrior of the Bear gens, in company with three of the Tortoise gens, for some reason or other, killed a woman of the Crane gens early one morning. Whether the murder was intentional—as appears to be the case from the position of the hearts in the first figure—or accidental, remorse was felt, and an offering made.

A similar custom of drawing a headless body, to signify *death*, is also found among the Eskimo, and an illustration is presented herewith which was copied from the original sketch on walrus ivory, (Fig. 6,) now in the collection of the Alaska Commercial Company of San Francisco, California.

Fig. 6. Innuit carving on ivory.

The left-hand figure, resembling a long handled fan surmounted by the image of a bird, is a "Shaman stick," or more properly, perhaps, a votive offering, or a grave stick, as it is termed by some Indians.

The middle figure, that of a headless man, denotes the person who had been killed. In his right hand is a spear or harpoon.

The right-hand figure signifies the person who committed the murder. His hand and arm are in the position of the termination of the gesture *to kill*, which is made by thrusting the closed hand earthward before the body. To prevent his having ill luck in hunting and fishing, and to appease the anger of the spirit of the departed, he has erected a "Shaman stick," placing upon it the emblem of a bird, the best that can be offered. The belief prevails that flying gods are good ones, and such as crawl or swim, evil ones.

The interpretation given in the Aigalúχamut dialect of the

southern Innuit will explain the character of the pictograph more fully, and serve also to show what a native can learn from a simple record.

Nu-na′-mu-quk′		a′-χ′-l-χik′
Place to		quarrel
ai′-ba-li	to-qgu′-qlu-gu′	nu′-hu
(with) one another	(one) killed him (the other)	(with a) large
tcuk	nac-qui′	glu-gu′
knife	took head	off
i-no′-qtclu-gu		ga-sa′ha-lik′
laid him down (buried)		Shaman
na-bon′	ca-gu′-lŭk	a-gu′-nŭ-qua-glu-hŭ′
stick	bird	to set (or place) on the top of (upon)

A personal exploit, recording the death of an enemy by an arrow at the hands of the recorder, is given in the accompanying sketch, (Fig. 7,) reproduced from an Eskimo carved implement in the

Fig. 7. Innuit carving on ivory.

museum of the Alaska Commercial Company. In this instance neither the absence of the head, nor any other method of showing death, as the erection of a "grave stick," was necessary, since the weapon which produces that effect was sufficient.

Fig. 8. Ojibwa sketch on bark.

Although the Ojibwa usually represent a dead man by drawing his totem in an inverted position upon the grave post, an

animal which has been killed is shown in an ingenious manner in the accompanying illustration, (Fig. 8,) copied from a bark scroll which was obtained from the Indians at Red Lake, Minnesota.

A moose was wounded in one of the fore legs, which is shown by the introduction into that extremity of a small peg of wood. This caused the animal to travel so slowly that it was finally overtaken and shot in the heart with an arrow and killed, as shown by the quill, the shaft of which penetrates the heart.

As this method of recording transactions and events upon birch-bark scrolls has been almost, if not entirely, discontinued, it is of the utmost importance to visit the various bands of the Ojibwa in order to collect such examples as may still be preserved with religious care, and in order to obtain interpretations of every form and variety of characters from the older and better informed Indians who may still be familiar with these interesting methods of pictographic representation.

The value of immediate investigation and comparison can be fully realized from the fact that there are tribes now living who have entirely forgotten such methods of delineation, although their association and intercommunication with the whites date from a later period of time than that of the Ojibwa.

Finally, the death of an individual may be signified by the presence of a grave stick or "Shaman stick," without any other indications. This is shown in the annexed sketch, (Fig. 9,) copied from an ivory implement in the museum above mentioned. In this

Fig. 9. Innuit carving on ivory.

instance, the survivor is shown holding on to the corner of the house with one hand, and with the other indicating the position of the individual—under ground—to whose memory he erected the offering. The deceased was one who shared his house, and was rather a fellow hunter than his spouse, as in the latter case a board showing articles of daily use would have been erected, the top presenting a rounded termination upon which would have been outlines of a woman's face.

The following illustration, (Fig. 10,) forming one of several

records of a personal nature, was copied from an ivory bow used in making fire, in the museum of the Alaska Commercial Company, of San Francisco. I was assisted in the interpretation of the most obscure portions of the narrative by a Kadiak mixed-blood, who was fortunately discovered in that city during the time of my investigations.

A represents one-half of the entire length of the bow, and shows the beginning of the narrative.

B and C are continuous, though upon another face of the bow. The explanations of the characters are here given:

1. A baidarka, or skin boat, placed upon poles for drying. 2. A winter habitation, known by being round topped. 3. A tree. 4. Winter habitations. 5. A store house. 6. A tree. 7. A store house. The rod connecting the latter with the tree, and another extending from the tree to No. 5, are placed in this position for drying fish. The entire series from 1 to 7 represents a village or settlement, the home of the narrator. 8. The hunter, or narrator, sitting on the ground in an attitude of supplication. He is asking the Shaman for success in the chase. 9. The Shaman. Incantations are performed by making short circular movements with the hands, above and on either side of the head. A Shaman is always drawn with one or both hands elevated, and the gesture for this personage is made as if he were performing such ceremonies. In the present instance the left arm is still raised, while the right is extended toward the supplicant, signifying that the request has been granted. 10. The Shaman's winter lodge. 11. Trees surrounding the habitations of this individual. 12. The Shaman's summer habitation. 13. Trees in the vicinity of the houses.

Another side of the bow presents the result of the chase, viz:

B. 14. A tree near the hunter's lodge. 15. The hunter's lodge. The desired success having been granted, the personal totem, or perhaps tutelar god of the hunter, is erected upon the roof of the habitation, as a mark of gratification and to insure greater success in the undertaking. The character could not be identified specifically, and may be unintelligible to any one save the hunter who adopted it, perhaps on account of its representing a mythical animal. 16. The hunter in the act of shooting. 17, 18. The game encountered, consisting of five deer. 19. The demon sent out by the Shaman to drive game in the way of the hunter. 20–23. Assistants to the demon.

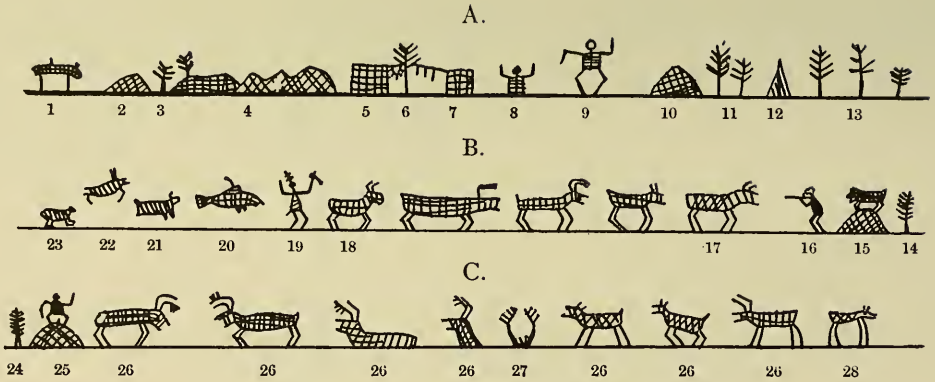

Fig. 10. Innuit record on ivory; two-thirds natural size.

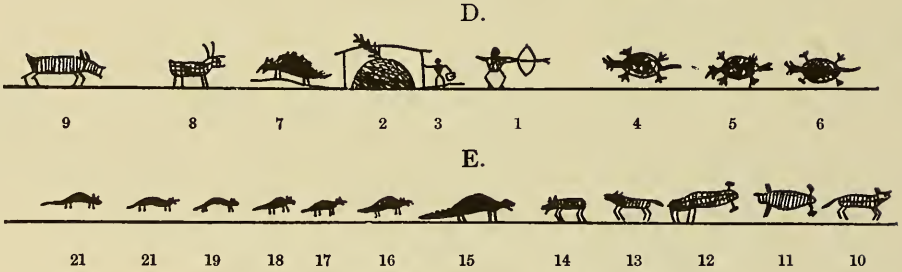

Fig. 11. Innuit record on ivory; two-thirds natural size.

C presents the fact that the hunter had previously applied to another Shaman for aid, but was refused, and the animals were bidden to depart and not permit themselves to be discovered.

24. A tree near the Shaman's lodge. 25. The Shaman standing upon the roof of the lodge, having just concluded his incantations, the left arm being raised as if to drive back the approaching game, while the right arm is brought earthward and rather more toward his person. In *giving* the arm is directed more toward the supplicant than in the present instance. 26. Deer, which had approached during the incantations, the first one having already turned about with a rather crest-fallen appearance. 27. Horns of a deer protruding above the water of a stream across which it is swimming. 28. Young deer. Recognized by smaller body and long legs.

The following text in the Ki'ate'χamut dialect, with literal translation, is of interest as showing both the syntactical structure, and the order in which the same narrative was given in gesture language:

Nu-nŭm'-cu-a Settlement man	u-χla'-qa came	pi-cu'-qi-a hunting
ku'-da go	ku-lu'-ni wanted (to) (and)	ka-χa'-qa-lŭk' Shaman (he) asked
ka'-χla-qlŭm' Shaman		mi-na'-qa-lu-qu' gave to him
ta-χli'-mu-nŭk fire		tu-du'-ia-nŭk deer
ka'-χla'-lŭk Shaman	u'-qli-nı went to top of	u^{n}-i-lum' lodge
kai'-na-nŭn' (where) standing on top		ka-χa'-hu-pi-gu' he made spirits (incantations)
i'-u-nĭ devil		au'-qkua-glu-hŭ' (was) sent to him (the hunter)
te'-itc-lu-gĭ' (and) brought		ta-χli'-mu-nŭk' five
tun-du'-ia-nŭk deer		tau'-na-cŭk same man
pi-χlu-nĭ' he caught		ta-χli'-mu-nŭk' five
tun-du'-ia-χa-nŭk' deer [*pl. form*]		tu'-gu-χli'-u-qi killed

a-χli′-lum	ka′-χla-qlŭm′
Another	Shaman
tu-mu′-qtcu-gi′	
did not grant request	

Another narrative from the same locality presents the manner of recording success in the chase. The animals are not as well drawn as those upon more recent ivory workmanship, and the specimen from which the annexed figures were copied appears to be a very old one. (Fig. 11.)

The story is to the effect that the recorder desired the number and variety of animals drawn; those having their heads directed toward the lodge are the ones which he secured, while those with their heads turned away are others which he desired but which he did not get.

The drawing in the original is continuous, but has here been divided; therefore, to understand the context, the left-hand end of D should be joined to the right-hand end of E. The following is an explanation of the several characters:

1. The hunter whose success is depicted. 2. Winter habitation, with smoke issuing from the opening in the roof. The cross-piece of wood, supported by two vertical poles, is used for drying skins and fish. 3. The hunter's companion. 4, 5, 6. Three beavers. 7. A porcupine. 8, 9. Deer. 10. A wolf. 11. A seal. 12. A walrus. 13. A fox. 14. A bear. 15. A land otter. 16. A weasel, according to the interpretation given, although there are no specific characters by which it could be distinguished from the succeeding figures. 17, 18, 19, 20, 21. Martens.

Ki′ate′χamut Text.

Hui′-nu-na′-gra		hui′-pu-qtu′-a
I (from) my place		I went
pi-cu′-qu-lu′-a		mus′-qu-li′-qnut
hunting		(for) skins of animals
pa-mu′-qtu-lit′	ta-hi′-mĕn	a-mi′-da-duk′
martens	five	weasel
a-χla-luk′	a′-qui-a′-mŭk	pi-qu′-a
one	land otter	caught
a-χla-luk′	ku-qu′-lu′-nu-muk	a-χla-luk′
one	wolf	one

tun′-du-muk deer		tu′-gu-qli′-u-gu′ I killed
me-lu′-ga-nuk′ two	pe′-luk beavers	pi-nai′-u-nuk three
nu′-nuk porcupine	pit′-qu-ni′ I caught none	ma-klak′-muk seal
pit′-qu-ni′ I caught none	a-ci′-a-na-muk walrus	pit′-qu-ni′ I caught none
wa-qi′-la-muk fox	pit′-qu-ni′ I caught none	ta-gu′-χa-muk bear
pit′-qu-ni′ I caught none		

The same narrative was also given in gesture signs, and the text shows the exact order of their execution and sequence, a result not often obtained when comparing sentences given in both oral and gesture language by other tribes south of the forty-ninth parallel of latitude.

The accompanying drawing, (Fig. 12,) was also copied from a piece of walrus ivory in the museum of the Alaska Commercial Co., of San Francisco, California. The carving was made by a Kiate′χamut Indian of southern Alaska, and represents the success of a Shaman in curing two patients.

Fig. 12. Innuit carving on walrus ivory.

The following explanation of the several characters will suffice:

1, 2. A Shaman's summer habitation, showing trees growing in the vicinity. The fact of their being placed upon the houses denotes that the houses stand in the shade. 3. The Shaman, who is represented in the act of holding one of his "demons" in reserve, to aid in the expulsion of the disease should the previous treatment fail. According to the natives, the sick are possessed of "devils," who will duly leave the body at the approach of a superior demon, such as the Shaman is believed to control. 4. The Shaman's de-

mon. 5. The same Shaman, going through the preliminary performance of exorcising the demons that cause the sickness of the two patients. 6, 7. Men who have just been relieved of sickness. 8. Two evil spirits fleeing from the bodies of the patients under manipulation by the Shaman.

From the large amount of pictographic material examined thus far, both upon the rocks in the various portions of the United States, where they were originally designed, and on various substances now preserved in both public and private collections, I can safely state that the work of the Eskimo is greatly superior to that of any other in the faithful delineation of natural objects, especially of animate forms. The Ojibwa bark records are probably next in order; but, on account of the introduction of mythical beings and mnemonic characters, the only means of obtaining interpretations is a thorough knowledge of their ceremonies and mythology. This is applicable also in the study of pictographs of other tribes; though it is evident that in many instances an intimate acquaintance with the gesture language, or I might with more propriety say the several gesture dialects, will be of more value, since the attempted reproduction of gestures and signs is of constant occurrence. Of the latter class the California pictograph already mentioned is an excellent example. The same advancement in recording the gesture language is also noticed in many of the Eskimo drawings.

The Chinese characters, the Egyptian hieroglyphs, and some of the Maya and Mexican drawings show abundant evidence of having originated in pictographic delineation of objects and actions. It is chiefly in the representation of subjective ideas that the aboriginal artist fails; but when the lines and curves corresponding to the movements of the hands in gesture were once delineated, one of the greatest obstacles in the graphic representation of ideas was overcome, and we may therefore conclude that a careful study of the gesture signs and their comparison with pictographs will lead to the surest results.

Mr. Dorsey, in referring to the fact that demons were supposed to aid the Shaman in bringing game in the way of the favored hunter, stated that the Kansas represent upon their mythologic chart a "venerable man," who is supposed to go out and call in the game.

Mr. JEREMIAH CURTIN then read a paper on "ILLUSTRATIONS OF MYTHOLOGY FROM SLAV AND MAGYAR FOLK-LORE."

ABSTRACT.

Folk-lore is the entire stock of wisdom accumulated by the unlettered masses of mankind in all ages and nations. Like language, it is the product neither of one mind nor a given number of minds, but of all the various groups which, together, form humanity; like language, it is in the possession of all men, common property bequeathed by anonymous ancestors or predecessors. As there is no nation, tribe, or group of persons without language, there is none without folk-lore, which, in a broad sense, is the fruit of the intellectual activity of men before they are modified by what is called education, and represents their religion, philosophy, and literature, if the latter term may be used with reference to people unacquainted with letters.

The first illustration was taken from the Magyar story of Mirko, the King's Son, in which a sword moves continually and cuts on every side, guarding the hero while asleep, so that a fly cannot reach him; this sword has its parallel in the sword of the 3d chapter of Genesis, last verse, "which turned every way to keep the way of the Tree of Life." The most characteristic incident of the story is that of turning a diamond castle into an apple, and then turning the apple back into a castle after the hero returns home. A similar case is found in the Russian story, Dawn, Twilight, and Midnight, where each of the three kingdoms of Gold, Silver, and Copper shrinks into an egg, is carried away in the pocket of a woman, and becomes a kingdom again at her desire, which is a process similar to that of making an acorn a tree in a few minutes, and then turning the tree into an acorn again, or like that in the 2d Book of Kings, 20th chap., where it is stated that the sun was turned back 10 degrees as a sign to King Hezekiah that he would recover from his illness. In all these cases the same principle is involved, namely, that of reversing the direction of forces now acting in the universe, of going back to yesterday and last year, of undoing an accomplished deed. Fate and predestination were illustrated from a Serbian tale, and the power of the word which creates and destroys, from Russian lore and the great feast, the Ramayana, produced by the prayers of the mighty sage Bharadwaja, who entertained an army of more than a million of men.

DISCUSSION.

Prof. MASON said that, so far as this combined learning of different peoples was concerned, the whole world seemed akin.

Prof. THOMAS referred to the publication several years ago of a collection of myths of the New World, and also to a later publication of hero myths, in the latter of which there are psychologic deductions at variance with the former.

Dr. FLETCHER then presented a scheme of nomenclature for the stature of the human body.

After referring to the several methods which had been adopted, the classification of Professor Zoja was submitted for the consideration of the Society.

SEVENTIETH REGULAR MEETING, May 1st, 1883.

Col. GARRICK MALLERY, President, in the Chair.

GIFTS.

From the SOCIETY.—Proceedings of the Davenport Academy of Natural Sciences; being the part III of Vol. III, 1883.

———Bulletin of the Philosophical Society of Washington, Vol. IV, 1881, and Vol. V, 1883.

From the GENERAL SECRETARY OF THE CONGRÈS INTERNATIONALE DES AMÉRICANISTES.—A circular with reference to the general meeting to be held at Copenhagen during the coming summer.

Mr. GATSCHET then read a paper on

THE SHETIMASHA INDIANS OF ST. MARY'S PARISH, SOUTHERN LOUISIANA.

The wide area of Louisiana was once the home of a large number of Indian tribes, whose names and locations are mentioned by the historians of the early colonies. These Indians were distinct from each other in language as well as in race, and if an investigator, of scientific attainments, had visited all of them 150 years ago, he would have probably discovered over forty dialects, belonging to at least eight linguistic families. Unfortunately, such a work was not undertaken at a time when it was possible to perform it, and all that we can do now is to collect the last remnants of a world of

speech. Even these are not free from foreign admixtures, and, as far as race is concerned, the majority of Louisiana Indians are no longer of pure blood.

The Shetimasha Indians, often in deadly conflict with the Chá'hta tribes, are distinct from other Indians in language and in some racial peculiarities. The banks of Grand Lake (formerly also Lake of the Shetimasha) and Grand river, or Bayou Atchafalaya (called She'ti, Tche'ti, in their language) seem to have been their earliest known habitat. Some sixteen or eighteen of these Indians still remain on Grand river and claim to own lands on it; but the majority of the tribe, about thirty-five persons, live at Charenton, a village on the southern bank of Bayou Tèche, St. Mary's Parish, not quite ten miles from the Gulf Coast. They have abandoned the tribal organization since the death of their chief, Alexander Dardin, in April, 1879.

The present Shetimasha Indians earn their living exactly in the same manner as the French creoles surrounding them. Too poor to run any of the large sugar plantations, with their expensive mills and other apparatus, and with the uncertainty of renting them, they prefer to earn wages in the service of the large sugar planters in summer-time, to raise some sugar-cane and kitchen vegetables for sale on the few acres which they own, to cut cypress timber in the swamps, (districts flooded in the rainy season,) and to manufacture baskets and other utensils. Articles like these are made by the women, who are hard workers and certainly more industrious than the men. About fifty-five Indians are all that now remain of this ancient tribe, and not more than one-half of these speak the Indian tongue, the rest using exclusively the Creole dialect of French. Every house contains quite a number of children, so that the tribe and even the language will not become extinct within a short time. But they have forgotten almost everything of importance concerning the history, traditions, wars, manners, and customs of their race. The oldest members of the tribe at the time I visited them (December, 1881) were three women, from sixty to seventy years of age, who are probably the only pure-bloods among them, and are of a very dark cinnamon complexion. The oldest man was but fifty, and the person best acquainted with their antiquities is Baptiste Angélique, an old negro living on Grand [illegible] several events mentioned by this hoary old sl[illegible] I h[illegible] enabled [illegible] esta[illegible]ish some points in the chronology [illegible] he [illegible] [illegible] [illegible] distin-

idea of our mode of computing years, he stated that he was born nine years "before the Jackson war," and married when "the stars fell from the skies," which indications respectively point to 1805 and to the meteoric showers of 1833 or 1834.

The aboriginal name which the Shetimasha give to themselves is Pa'ntch pinunkansh, "*men altogether red.*" Of course, this name could not have originated before the advent of the whites and negroes; and, by the way, it may be noticed that the Indians of the Gulf States do not intermarry with the negro, while in the north—the Long Island Indians for instance—many tribes have done so extensively. Of the name *Shetimasha*, these Indians can give no account, but state that the Alibamu Indians, living west of them, pronounce it Tchikĕmahá; the earliest French historians wrote Shyoutémacha, Tchoutymacha (1700), etc. Like the name of the Taënsa tribe, their name is taken from the Chá'hta language; it means "*they have cooking utensils;*" tchùti meaning *pot, vessel for boiling;* and imásha, *they possess, they own.* For this etymology I am indebted to Allen Wright, Governor of the Chá'hta Nation, Indian Territory.

The old French colonists were in the habit of visiting and describing only the tribes whom they found settled on the high roads of travel and commerce, and thus our historic knowledge of many inland tribes is very fragmentary. Only the tribes on the Mississippi and Red rivers were fully noticed by the French chroniclers; and had the Shetimasha not caused an aggressive movement of the French and their Indian allies by murdering the Na'ktche Missionary, Saint Cosme, in 1706, on the Mississippi river, nothing besides their tribal name would have come down to us from the eighteenth century. Le Page du Pratz tells us that after a protracted warfare, the Shetimasha finally compromised the difficulty by soliciting a peaceable settlement, and "chanting the calumet" before one of the French commanders.

The luxuriant vegetation of the country inhabited by these southern Indians has often been described by eloquent authors fully able to appreciate the beauties of nature. A semi-tropical sky overarches that land, and its sultry climate produces all the plants, herbs, and fruits adapted to the luxuriant soil. The finest spectacle is presented by the gigantic live oak, the limbs of which begin to expand out of the vigorous trunk not far from the soil, rise to altitudes of 150 feet, and droop down their long gray mosses in profusion.

A correspondent of the New Orleans *Times-Democrat* writes of that part of Bayou Tèche which lies between St. Martinsville and Breaux Bridge, where the live oaks on either bank are more dense than at any other point:

"The scenery is wilder, as the cultivated places at most points are some hundred yards back from the water. The oaks, with here and there a monarch cypress, assume the most varied shapes and seemingly impossible attitudes—sometimes receding from the bank at an angle of fifty degrees, and a little further on stretching their rugged branches far out over the water.

"There is little or no underbrush, and this affords delicious vistas through the heavy trunks back to the fields beyond. The oaks in their new garniture of fresh foliage, and patriarchal in their Mohammedan beards of gray, seem to laugh at the evanescent changes going on around them. Solid, strong, apparently eternal, they have stood their watch over the Tèche, have sheltered the man-eating Attakapas Indian and squaw, have waved their arms at the approach of the Acadian boats, as with measured stroke their sturdy navigators came slowly along to give new life to these prairies and awaken these forests to a day of plenty. The story of Evangeline is familiar to the people of the bayou. They point to the church at St. Martinsville as being situated on the site of the old edifice where she worshipped; and LONGFELLOW'S story has touched tender chords among those the history of whose ancestors he has so tenderly written."

Settlements of the Shetimasha, or Gens de la Fourche, (Bayou Lafourche,) existing about 1700. From Baptiste Angélique, and the last two from maps.

(námu is *village*, táta, *city*, tchāt, *bayou*.)

1. Tchāt Kasítunshki, (better than the form Kawítunshki,) now Charenton, on Bayou Tèche, southwest side of Grand Lake.
2. Amátpan námu, Bayou Gris, 3 miles east from Charenton, on the lake shore.
3. Nēt Pinu'nsh "Terre Rouge," 2 miles west from Charenton, on Bayou Tèche.
4. Shóktangi háne hetchi'nsh, on an inlet of Grand Lake, about 3 miles north of Charenton. Their central house for religious dances and the burial ground of their chiefs was in this locality. Now it is the sugar plantation of Mr. Price.

5. Ne'kun si'snis, or "Round isle," opposite Ile aux Oiseaux, in the Lac de la Fausse Pointe.
6. Hipinimtch námu, on the western part of Grand Lake, at the Fausse Pointe, near Bayou Gosselin, (hípi, *prairie*, nímtch, *road* and *portage*.)
7. Námu kátsup, Bayou Chène village, St. Martin's parish.
8. Kúshu'h námu, on Lake Mingaluak, near Bayou Chène; (kú-shú'h is *cottonwood tree*.)
9. Káme náksh tchāt námu, at Bayou du Plomb, a large Indian town, near Bayou Chène, 18 miles north of Charenton.
10. Tsáχtsinshup námu, on Grand river, near Plaquemine Bayou.
11. Grosse Tête námu; Indian name not remembered; two miles from the Plaquemine village, Tsáχtsinshup námu.
12. Tchétin námu, east of Plaquemine, on Grand river, the name of which was Tchéti, Shéti, 20 miles east of Charenton.
13. Tcháti Kutíngi námu, at junction of Bayou Tèche with Bayou Atchafaláya.
14. The site of Donaldsonville, Assension parish, on the west shore of the Mississippi river, was that of a Shetimasha village. The missionary, St. Cosme, was murdered there by the Shetimasha, in 1706. The present Indians know nothing of that settlement, nor of the following.
15. Mouth of Bayou Lafourche, (Tchát Na'χtsĕbu,) where it empties into the gulf. This bayou was probably held by the Shetimasha in its whole length.

In their aboriginal state the tribe supported themselves mainly by vegetable food; but they also ate the products of the hunt, which consisted of deer and other smaller animals. The women had to provide for the household by collecting pistaches, wild beans, a plant called kúpinu, (kántak in Chá'hta,) and another called woman's potatoes, the seed of the pond-lily (áktā), grains of the palmetto, the rhizoma of the common *Sagittaria*, and that of the *Sagittaria* with the large leaf, persimmons, (plaquemine in Creole, nánu in Shetimasha,) wild grapes, cane-seed, and súccû, (guspí in Shetimasha.) They also planted, to some extent, maize, sweet potatoes, and, after the arrival of the whites, wheat; or procured these articles by exchanging their home-made baskets for them.

The fishing in the lakes and bayous was done by the women, men, and boys; not with nets, but only with hook and line. They fished at night just as often as during daytime.

These Indians were strict monogamists, and the husband could remarry only when he had lost his wife by death.* The young women were severely beaten if they took any improper liberties with men of their acquaintance. I have not been able to find any proof of the existence of phratries and totems among the Shetimasha; but there can be hardly any doubt that they once existed among them. The women must have exercised authority in the tribe, for, as late as this nineteenth century, two women, after the demise of their husbands, who had been village chiefs, succeeded them in this charge.

The women had a peculiar method of fastening their infants in the cradle-boards. They rocked them in such a way that the forehead was flattened, while the back of the head assumed a round shape by the rocking motion. This implies that the flattening pad, or short piece of wood, was fastened to the head only, and not at the same time to the cradle-board, as is done with the Pacific Coast Indians.

The Shetimasha men wore the hair long, and fastened a piece of lead to the end of the tress behind for the purpose of keeping the head erect. They adorned themselves with much care and artistic taste, and tattooed their legs, arms, and faces in wavy punctured lines. They sported necklaces, finger-rings, bracelets, nose-rings, and ear-rings.

The warriors enjoyed a peculiar kind of distinction, as follows: Certain men, especially appointed for the purpose, had to paint the knees of the warriors with pulverized charcoal, and this was made to stick by scarifying the skin with the jaw of a small species of garfish until it began to bleed slightly, after which the coloring matter was rubbed on. This manipulation had to be repeated every year.

The outward distinction of the chiefs consisted in the privilege of carrying a much larger tobacco pipe than the warriors, which they exhibited at the ceremony of chanting the calumet. The cabin in which they dwelt was also of larger size than those of the other Indians.

The women wore their hair in plaits or tresses, ornamented with plumes. A portion of the hair was wound in a coil about the head

* If there is any truth in this statement, it forms a singular exception to the common practice in Indian conjugal customs, which are dictated by mere sensuality.

and secured by pins. Their ornaments were bracelets, ear-rings, and finger-rings. In painting themselves they used only the red and white colors.

The tribal *dance-house*, or "maison de valeur," intended for religious dances, stood on a little bay of Grand Lake, about three miles northwest from the present village of Charenton. Like all other lodges, it was about twelve feet square, with a pointed roof, but it was surrounded with a picket fence. It contained nothing else but the garments of the dancers and the three kinds of paints used at this ceremony: the hápt, or vermilion paint, the kúps, or black paint, and the kúpshesh, or white paint. No idols, stuffed animals, perpetual fire, etc., were to be found in connection with it, as was the case with the temple of the Natchez people. They called this dance-house Shóktan gi hána hédshinsh; all the other dance-houses, hána nèdshámtuina. The place where it stood is now a sugar-field, and was called by the Creoles Graine-à-volée, from the nuphar plants growing in the vicinity.

As there was only one meeting place of this description among all the Shetimasha, the participants gathered from all the surrounding lake settlements by canoes the day before the new moon. Men, women, and children flocked to the ceremony in large numbers. The ceremony took place in honor of Kut-nähänsh, or the Noon-Day Sun, and in summer time lasted longer than at other seasons of the year. The management was entrusted to leaders, (pékidshinsh,) who were provided with long wands, or poles. The men danced with the breech-clout on, the body painted red, and with feathers stuck in the ribbons encircling the head: gourd-rattles and the scratching of alligator skins furnished the music for the occasion. They fasted during the six days the dance lasted. When the ceremony was drawing to a close, they drank water in order to produce vomiting; and, after they had removed in this manner any impurities in their system, they began to eat heartily.

Analogous to this is the custom of some tribes of the Jivaro family, on the Putumayo river: the men tickle their throats every morning to produce vomiting, and then take breakfast, considering it unwholesome to eat with even the least impurity in the stomach.

The principal deity of the Shetimasha, as well as of most other American nations, was the Sun, although worshipped here under the special form of the Noon-Day Sun, Kut-Nähä', which literally means the half circle, the circle or orbit half completed, the culminating sun.

No other worship of the sun existed except that by dances, just like those celebrated at the initiation rites, which were performed by the men and women during a fast. An addition was, however, made to these dances: a huge cone of dry reeds, which was erected and set on fire at noon. Then the dance continued around it until the pile was consumed, which lasted about thirty minutes. All this took place at the communal lodge, or temple, called hána hedshinsh, on an inlet of Grand Lake.

The Shetimasha had other divinities besides: the great devil, the little devil, and the last devil. I could learn nothing distinct about the nature of these, but probably one of them represented the Jack o'Lantern, or *feu folâtre*, then very frequent about the shores of Shetimasha Lake, around which their settlements were situated. The word for devil (*neka*) means, also, witch, sorcerer, and witchcraft.

The initiation of the boys had not the purpose of imparting to them certain mysteries concerning the worship of their main deity, the Noon-Day Sun, but simply aimed at making them insensible to the pangs of hunger and thirst. Dressed in breech-clouts, their heads adorned with feathers, ribbons, red paint, and small gourds, they had to dance for six days in the temple, while fasting and without tasting a drop of water, led by their *ephori*, or disciplinarians. No female was allowed to approach, although they had access to the ceremonial dances at the new-moon festivity.

In the vicinity of this communal lodge also were performed mortuary ceremonies. One year after the death of a head chief or of any of the village war chiefs, of whom there were four or five, their bones were dug up by a certain class of ministrants called turkey-buzzard men, ("ramasseurs d'os"; ō'sh hä'tchna, in Shetimasha), the remaining flesh separated, the bones wrapped in a new and checquered mat, and brought to that lodge. The inhumation of these bones took place just before the beginning of the Kut-nähä worshipping ceremony or dance. The people assembled there, walked six times around a blazing fire, after which the bones were placed into a mound. The widow and the male orphans of the deceased chief had to take part in the ceremonial dance.

The burial of the common people was effected in the same way, one year after death; but the inhumation of the bones took place at the village where they had died. We find this singular custom also among the Chá'hta and many other southern tribes, though the time assigned for it varied from one to five or ten years after death.

Language.—Although my chief purpose in going south was to study the Shetimasha language, I cannot give here a full account of it, for it would fill not less than one hundred pages.

This language, of which no other dialects are known to exist now, is vocalic, and nasalizes its vowels to a small degree only. It has a profusion of declensional and conjugational endings, suffixes the personal pronouns to the finite verb, forms a passive voice, and seems to be extremely polysynthetic as far as derivation by suffixes is concerned. Ternary and quaternary compounds are not uncommon. The numerals show the decimal system of numeration, not the quinary one, which is the most common in the Indian languages spoken within the United States. For the pronoun *thou* they have one form to address common people, and another reverential one to address superiors, etc. Something of the kind is found also in the southern dialects of the Dakota family, as Ponka and Omaha.

I will present here a list of derivatives added to the words of which they form compounds. This list is very instructive for showing the mental processes which these Indians have followed in forming their ideas—the concrete as well as the abstract ones.

akstegi′, (1), *purchased, bought;* (2), *wretched, miserable.* Quite similar is the connection traceable between Ital. cattivo, French, che′tif, which mean *miserable,* but formerly meant *captive, prisoner of war;* the English caitiff, also derived from Latin *captivus,* has even assumed the moral signification of *wicked, mischievous,* like the Italian term.

ga′mpa, ka′mpa, *heavy, weighty;* from this: ga′mpata *metal,* as *tin, lead, ball, bullet.*

hu′ *lake;* from this, hu′ta, *pirogue, canoe;* shu′sh-hu′ta, shushu′ta *box;* lit. "wooden canoe;" t′ep-hu′ta, steamboat, lit. "fire-pirogue;" te′p-hu′ta-ne′gsh-apshtchu′ma, *locomotive* and *railroad train;* lit. "steamboat traveling on the ground."

ka′mĕki, ka′mkish, *long, elongated;* also means *wolf;* wa′shka′mkin nā′kspu, *jackass,* lit. "the small mule," "the small long animal." Cf.-ō′sh, ku′t.

ka′nush, a *Frenchman,* or *French Creole,* of Louisiana, because the early French colonists of Louisiana came from the Canadian lakes, the countries inhabited by "Kanucks." Ka′nush is not a Shetimasha term.

kā′tchti, *to drink;* Kā′tchmish, *conjurer, Shaman,* is derived from this term, because he drinks the infusion of Cassine leaves,

(nuait, in Shetimasha,) to put himself in a stupor, and awakening from it predicts what he has seen.

ki'sh, *dog;* kish-átin, *horse*, lit. "great dog." Kish-kushma'msh, Canadian; lit. "dog-eater."

ki'pi, (1) *flesh;* (2) *body of man, animal;* (3) abbr. into -kip, -ki, a *suffix* equivalent to our *-like*, in womanlike, warlike, and also abbreviated into -ly (friendly, surly, for friendlike, sour-like); it also answers to the German suffix -lich and the Greek -ειδής, -ώδης. All of these originally meant *body, flesh, kind, form*, like the Shetimasha term kipi; εἶδος in Greek, leik in Gothic, lîc in Anglo-Saxon.

kú, *liquid, water;* when nasalized, ku'ⁿ, *river*, or ku'ⁿ atinsh, *great river;* mi-ku', *milk;* lit. "liquid of the breast or udder;" kú-tep, *fire water*, the interpretation of the Spanish *aguardiente; "to be drunk"* is, to the Shetimasha Indian, *to die of fire water;* and in Aztec *to die* is often used for "to suffer;" ku'-yuks (1) *panther*, lit. "water-tiger;" (2) *domestic cat.* Cf. ni'ku, under nē.

kút, *head;* from this are derived ku'tku, *hair*, kuti', *roof*, "head(of house?)" ku't ma'kte ka'minsh, *dolichocephalic skull;* lit. "head long behind;" Kut-nä'hä, the name of the chief national Deity, "half round," or "half head," as explained above.

nánu, *persimmon;* in Creole French, *plaquemine;* ṇánu ati'nsh, *apple;* lit. "large persimmon."

na'kshi, *one who is in a hurry;* and also *warrior, brave;* na'ksh means *war.* In the Klamath of S. W. Oregon ki'lōsh means, *one who makes bold gestures*, one *wrathful*, and also *a bold warrior.*

núp, *sweet potato, batate;* núp mestekáṇ, lit. "batate altogether white," for *turnip.*

nē', ní, *earth, mud, land, country;* nē'gsh, *on the ground;* nēt, *tobacco*, because its leaves grow near the ground; ne-witi, *butte, mound;* lit. "thrown upearth;" nē häshpa'tchpa, *brick;* lit. "mud pulverized (and) baked;" ne' tsā'χtsa, *salt*, lit. "sour earth;" tsā'χtsa, meaning here *sour* and *sweet*, because in both sensations a *biting* of the tongue is experienced; ni'-ku, *island*, lit. "river land;" ni'msh, *portage;* contr. from nē-mish *land road* (of the canoes).

ō'sh, ū'sh, *turkey buzzard;* ō'sh nēka'mki, *bat;* lit. "long turkey buz-

zard." The men placed in charge of sepultures one year after death bore the name of *turkey buzzards;* in Creole, *hommes carancros;* in Shetimasha, ō'sh-hätchna, the last term being equivalent to *picking up.*

pe'kua, *upper, superior;* pe'kup, *above, upland;* pe'kuampa, *slave,* lit. "upland person," because the slaves or captives taken from the tribe were usually sold to the upland tribes. With us, the term *slave* embodies the name of the people which at one time furnished a number of slaves to the Germans, viz., the Slavic nations.

pu'p, *rabbit;* means also *one hundred.* In some Polynesian languages, *hair* is used to designate the same idea; in Chinese, *many* or *a great many* is expressed by *ten;* pu'p-ati'nsh *sheep,* lit. "large rabbit."

sít, *sea, ocean;* sítup ke'tangi, *on the sea-shore.* I am induced to derive sít from sí'htgi, *to smell, emit odor,* through the analogy of Winnipeg, Winnebago, two Ojibwē terms referring to nauseous exhalation of lake shores, produced by putrescent organisms. From this verb is also síti, *locust-tree* (Robinia pseudacacia), a tree very fragrant in its blossoming season.

te'p, *fire;* te'p she'sht, *smoke;* lit. "smoke of fire," as opposed to te'p nēt, "smoke of tobacco." Cf. ku'-tep and te'p-huta under kúe, hu'ta. Te'p is probably derived from the radix of te'pigsi, *to place* (wood) *upon;* in the same manner as we say *to build a fire;* Cf. kum-tepa', *cover;* shu'sh-kum-tepa', *wooden cover,* lit. "wood placed upon;" te'p-shi, *ashes;* lit. "ashes of fire."

yáχ, yá'h, ya', (1) *strong in body, corpulent, stout;* (2) *grown up, adult;* (3) *German,* from their stout exterior. An *Irishman* is to them a "stout man digging in the ground."

shu'sh, *wood, tree, plant;* a'k-shush, *cypress tree;* shu'sh-tchī'sh, *leaf;* su'sēks odshi'bu, *opossum;* lit. "wood hog; shusheya', *fence, fenced enclosure;* shush'-amu, *cotton;* shush-wa'e, *barrel.*

DISCUSSION.

Col. MALLERY and Prof. MASON both remarked the importance of the material upon which the present paper was based.

Dr. WELLING inquired whether the Shetimasha had come in close communication with the French, beside their intercourse with the Creoles; to which Mr. GATSCHET replied that they were

rapidly losing their own language and adopting the Creole patois. In fact, when among themselves, they thought in French and spoke in Shetimasha. Mr. GATSCHET then presented some examples of the patois, and remarked that only those familiar with classic French could understand these natives.

MOUND DISTRIBUTION IN THE UNITED STATES.

This was the title of a paper read by Prof. CYRUS THOMAS. It was accompanied by a map, showing in color the distribution of the several varieties of mounds, which were treated in groups, with theories as to their construction, etc.

ABSTRACT.

1. Explain method of making map.—By counties.
2. Signification of colors.
3. Characters of mounds in different sections.
4. I take for granted that the mound-builders were Indians.

I.—Inferences to be drawn from the map.

1. That the advent of mound-builders was not from the Atlantic Coast.
2. That the Iroquois came from north of the St. Lawrence.
3. That those of the lower Mississippi section entered from the west, and their movement was north or south along the river.
4. That those of the Gulf States came from the west, moving east, (or through Florida, moving west.)
5. That those of the middle Mississippi region came from the west or northwest, or possibly through Michigan.
   a. It is possible the Delawares and kindred Illinois tribes came from the north of the lakes; the latter breaking off north of Lake Huron or Ontario, crossing southward into Michigan, while the former continued eastward, crossing the St. Lawrence, thence moving southward.
6. That those of Ohio were the earliest of the mound-builders, and probably were driven southward into east Tennessee and North Carolina.
   a. That it is probable the southward movement was commenced

by pressure of the Cat or Erie nation, and completed by pressure of the Iroquois.

b. Azatlan in Wisconsin possibly a colony.

7. That the builders of the Effigy mounds of Wisconsin were probably remnants of different tribes driven into this region by pressure from the south and west.
8. That the tribes of Maryland, Virginia, North Carolina, and South Carolina were possibly the predecessors of the mound-builders, driven eastward by their incursion.

II.—Secondary Deductions.

1. That the main stream which poured into the northern sections came from the northwest, partly along the north side of the lakes, partly between them, and partly around the west end. If so, mounds may possibly be found along the Red River of the North and north of the lakes.
2. That those of the southern section are off-shoots from the stream which found its way into the Rocky Mountain region.
3. But all this gives us no clue to the origin of mound-building.

DISCUSSION.

A short discussion followed which was participated in by the President, Prof. Mason, and others, when the Society adjourned.

SEVENTY-FIRST REGULAR MEETING, May 15th, 1883.

Colonel GARRICK MALLERY, President, in the chair.

The election of John J. McElhone as an active member was announced. Letters were also read, acknowledging their election to Honorary Membership, from Prof. Busk, Sir Henry S. Maine, Prof. Sayce, Dr. John Beddoe, Prof. Carl Vogt, Sir John Lubbock, Prof. W. H. Flower, Mr. John Evans, Prof. Huxley, Prof. Quatrefages, Prof. G. Cappellini, Prof. Cartailhac, Dr. Paul Topinard, and Prof. Worsaae.

The Curator reported the receipt of a number of pamphlets, as follows:

From Mr. JOHN EVANS.—On portions of a cranium and a jaw in the

slab containing the fossil remains of the Archæopteryx. London. 1881.

——— An address delivered in the Department of Ethnology and Anthropology, British Assoc. Adv. Sci. Liverpool. 1870.

——— Note on a weapon of stone found in a stone barrow at Pelyut.

——— Address on the present state of the Question of the Antiquity of Man.

——— An address delivered to the Anthropological Institute of Great Britain and Ireland. London. 1878.

——— An address, etc. 1879.

——— Unwritten History, and How to Read it. London. 1882.

——— Note on a proposed International Code of Symbols for use in Archæological Maps, *n. d.*

Mr. W. H. Holmes read the following paper on

THE USE OF THE CROSS SYMBOL BY THE ANCIENT AMERICANS.

It is not my intention to raise the question of the origin of the cross symbol. Wise men have studied the problem in vain, and their answers have only tended to deepen the mystery.

I desire simply to bring together a number of facts in regard to this symbol, in order to determine, if possible, something of its significance in the aboriginal art of America.

Upwards of a dozen varieties of the cross are distinguished in the art of the Old World. Prominent among these are the Greek, the Latin, the Tau, the Fylfot, and the Crutch Crosses.

The Greek Cross (Fig. 1) is probably the most usual form, as it can be found in the art of nearly all nations. It is frequently enclosed in a circle, as shown in Fig. 2.

Fig. 1.

Fig. 2.

The Latin Cross, (Fig. 3,) so called because in great favor with the Latin races, has the lower arm much elongated. It is the cross

formerly employed in crucifixion. With Romanists it takes a variety of forms, some having but a single cross piece, while others have three or more. The elaboration of detail in these crosses is almost infinite.

Fig. 3.

The Tau (Fig. 4) is one of the oldest known forms of the cross, being found among the sculptures of Nimroud and Egypt. It is said to have been regarded by the Druids as a symbol of God. It is found among Gnostic and Hebrew charms, and was an all potent sign with the Knights Templars. It has an important place in Christian art, and is very generally known as the Cross of St. Anthony. The Crutch Cross, or cross potent, consists of four of these crosses arranged about a centre, as shown in Fig. 5.

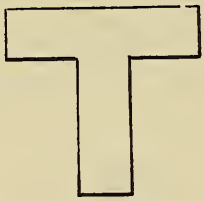

Fig. 4.

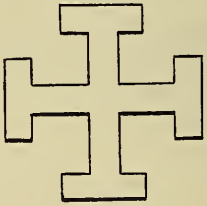

Fig. 5.

Probably the most singular of all the forms of this emblem is the Fylfot, or Four-footed Cross, Fig. 6, the hammer of Thor the Thunderer, the god of the Scandinavians. The emblem of this god, according to Jewett, was a thunderbolt; which was represented by a hammer of gold, shaped like a cross, with arms more or less bent at the outer ends. It is a very ancient form, and it is not known what country or people gave it birth. It is embodied in the

art of Scandinavia and Denmark, and occurs frequently in both Celtic and Roman antiquities of Britain. It may be found on Roman and Etruscan pottery, and even on the porcelain of the ancient Chinese. It is of frequent occurrence on the ancient coins of nearly every country in Europe.

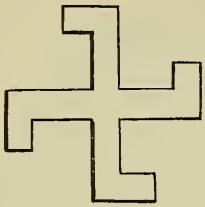

Fig. 6.

Fig. 7.

A variety of this cross is made by curving the arms, as seen in Fig. 7; other forms are hardly less widely scattered over the Eastern continent.

It is apparent from this slight review that an attempt to trace any of the American forms to a particular part or people of the East will be quite useless. All attempts to do so have signally failed, and we are compelled to look upon its occurrence in the two continents as one of those strange analogies so often developed in the arts of peoples totally foreign to each other.

The art of the ancient Americans will be found to furnish examples of nearly every known form of the cross. If written history does not establish the fact that the cross had a place in our aboriginal symbolism, we can turn to the pages of the great archæologic record, where we find that it is intimately interwoven with conceptions peculiar to the western continent. It is found associated with other prehistoric remains throughout nearly the entire length and breadth of America. It is found in Yucatan, in Mexico, and in Central America. It was reverenced in Paraguay and in Peru; and the first Spanish explorers of Florida, Cibola, and California declare that the cross was an object of veneration in these places.

In exploring the ancient remains of the United States many examples of the cross have been brought to light: these have been casually described from time to time.

I have the pleasure of presenting a number of new examples of this symbol obtained recently from the mounds and graves of the

Mississippi Valley. These examples are nearly all engraved upon disks of shell which have been employed as pendant gorgets. In the study of these particular relics, one important fact in recent history should be kept constantly in mind. The first explorers were accompanied by Christian zealots, who spared no effort to root out the native superstitions and introduce a foreign religion, of which the cross was the all-important symbol. This emblem was generally accepted by the savages as the only tangible feature of a new system of belief that was filled with subtleties too profound for their comprehension. As a result, the cross was at once introduced into the regalia of the natives; at first, probably in a European form and material, attached to a string of beads in the manner in which they had been accustomed to suspend their own trinkets and gorgets; but soon, no doubt, it was delineated by their own hands upon tablets of stone and copper and shell, in the place of their own peculiar conceptions. From the time of La Salle down to the extinction of the savage in the middle Mississippi province, the cross was kept constantly before him; and its presence, in such remains as post-date the advent of the whites, may thus be accounted for. Year after year, as exploration goes on, articles of European manufacture are discovered in the most unexpected places; and we shall find it impossible to assign any single example of these crosses to a prehistoric period with the assurance that our statements will not some day be challenged. It is certainly unfortunate that the American origin of any work of art resembling European forms must rest forever under a cloud of suspicion. As long as a doubt exists in regard to the origin of a relic, it is useless to employ it in a discussion where important deductions are to be made. At the same time it should not be forgotten that the cross was undoubtedly used as a symbol by the prehistoric nations of the South, and consequently that it was probably also known in the North. A great majority of the relics associated with it in ancient mounds and burial places are undoubtedly aboriginal. In the case of the shell gorgets, the tablets themselves belong to an American type, and are highly characteristic of the ancient art of the Mississippi Valley. A majority of the designs engraved upon them are also characteristic of the same district. The workmanship is purely aboriginal. I have not seen a single example of engraving upon shell that suggested a foreign hand, or a design, with the exception of this one, that could claim a European derivation.

A study of the various designs associated with the cross in these gorgets will be very instructive and may enable us to form some idea of its place and importance as a symbol. In two cases it has been inscribed upon the backs of artistically engraved spiders, as shown in Fig. 8. This specimen was obtained from a mound in

FIG. 8. Shell gorget with engraving of a spider and cross.

St. Clair county, Illinois. It has been suggested that the cross may simply be a representation of the pretty well defined cross found upon the backs of some species of the genus *Atta*, but there appears to be good reason for believing otherwise. The cross here shown has a very highly conventionalized character, quite out of keeping with the realistic drawing of the insect, and, what is still more de-

FIG. 9. Cross from a shell gorget.

cisive, it is identical with forms engraved upon other objects and associated with other symbols. The conclusion reached is that here, as elsewhere, the cross has a purely symbolic character.

In Fig. 9 we have an example of the Fylfot Cross, which occurs upon the back of a spider engraved on a shell gorget, from the same locality as the preceding. In another case the cross is surrounded by a rectangular framework of lines, looped at the corners, and guarded by four mysterious birds. The example presented in Fig. 10 was obtained from a stone grave on the Cumberland river, Tennessee. It is a shell gorget of the usual form. In the center is a symmetrical cross of the Greek type inclosed in a

Fig. 10. Shell gorget with a cross.

circle. Outside of this are eight pointed pyramidal rays ornamented with transverse lines. The whole design presents a remarkable combination of the two symbols, the cross and the sun. The outer portion is very interesting and of a character purely aboriginal.

Fig. 11. Cross from a shell gorget.

The cross shown in Fig. 11 is taken from a gorget similar to the one just described.

The gorget presented in Fig. 12 belongs to the collection of Mr. F. M. Perrine, and was obtained from a mound in Union county, Illinois. It is a little more than three inches in diameter and has been ground down to a uniform thickness of about one-twelfth of of an inch. The surfaces are smooth, and the margin is carefully rounded and polished. Near the upper edge are two perforations for suspension. The cord passed between the holes on the concave side, wearing a shallow groove. On the convex side the cord marks extend upward and outward, indicating the usual method of suspension about the neck of the wearer. The cross which occupies the center of the concave face of the disk is quite simple. It

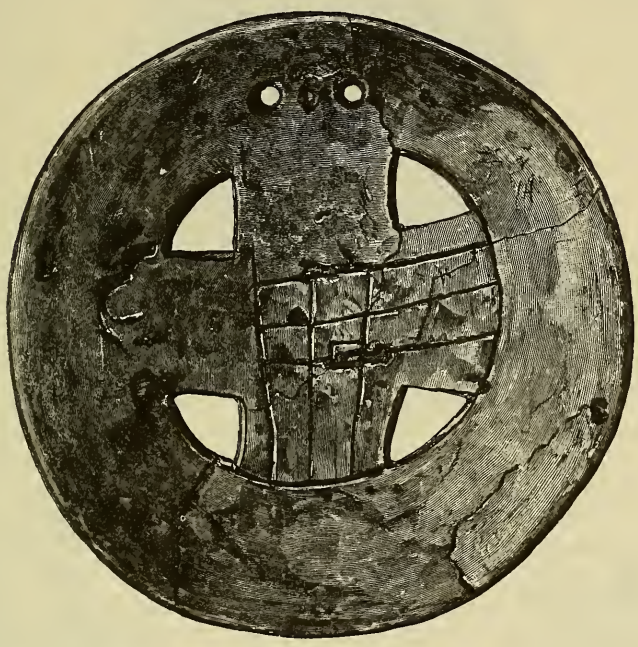

Fig. 12. Shell gorget with cross, from a mound in Union county, Ill.

is partially inclosed on one side by a semicircular line, and has now no other definition than that given by four triangular perforations which separate the arms. The face of the cross is ornamented with six carelessly drawn incised lines, interlacing in the center, as shown in the cut—three extending along the arm to the right and three passing down the lower arm to the enclosing line. I have

not been able to learn anything of the character of the interments with which this specimen was associated.

The gorget shown in Fig. 13 contains a typical example of the cross of the mound builder. The border of the disk is plain, with the exception of the usual perforations at the top. The cross is enclosed in a carelessly drawn circle; and the spaces between the arms, which in other examples are entirely cut out or filled with rays or other figures, are here decorated with a reticulated pat-

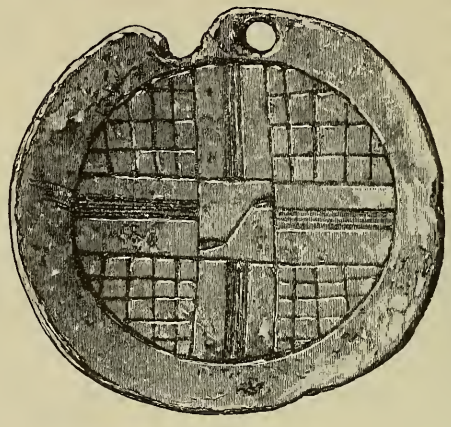

Fig. 13. Shell gorget with cross, from a mound in Tennessee.

tern. The lines which define the arms of the cross intersect in the middle of the disk. The square figure thus produced in the center contains a device that is probably significant. A double-curved or S-shaped incised line, widened at the ends, extends ob-

Fig. 14. From a shell gorget, Ill.

Fig. 15. From a shell gorget, Tenn.

Fig. 16. From a shell ornament, New York.

liquely across the square from the right upper to the left lower corner. This figure appears to be an elementary or unfinished form of the device found in the center of some of the more elabo-

rately carved disks of shell. This specimen was obtained from a mound on Lick Creek, Tenn., and is now in the Peabody Museum. The drawing is somewhat inaccurate in detail, as it was made from a hastily executed pencil sketch. Other forms from Tennessee, Illinois, and New York are shown in Figs. 14, 15, and 16.

The small gorget presented in Fig. 17 is of inferior workmanship, and the lines and dots seem to have a somewhat haphazard arrangement: The cross, which may or may not be significant, consists of two shallow irregular grooves, which intersect at right angles near the center of the disk and terminate near the border. There

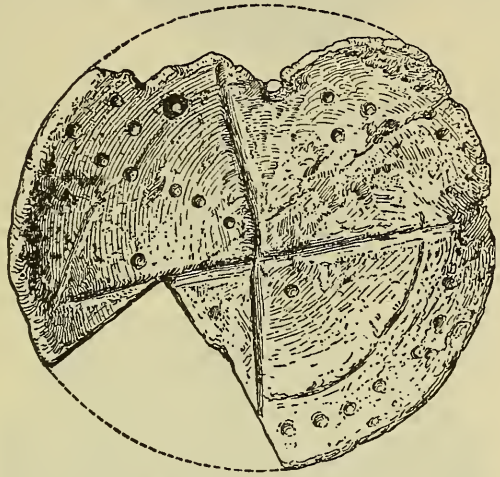

Fig. 17. Shell gorget with cross, from a mound, Tennessee.

are indications of an irregular, somewhat broken, concentric line near the margin. A number of shallow conical pits have been drilled at rather irregular intervals over most of the surface. A triangular fragment is lost from the lower margin of the disk. This specimen was obtained from a mound on Lick Creek, East Tenn., by Mr. Dunning.

In Fig. 18 I present a large fragment of a circular shell ornament, on the convex surface of which a very curious pattern has been engraved. The design, inclosed by a circle, represents a cross such as would be formed by two rectangular tablets or slips, slit longitudinally and interlaced at right angles to each other. Between the arms of the cross, in the spaces inclosed by the circular border line, are four annular nodes, having small conical depressions in

FIG. 18. Shell gorget, from a mound on Fain's Island, Tennessee.

FIG. 19. Fragment of a shell gorget, from Charleston, Missouri.

their centers. These nodes are relieved by cutting away portions of the shell around them. In the center of the cross is another small node or ring similarly relieved. The lines are neat and deeply incised. The edge of the shell has been broken away nearly all around. The accompanying cut represents the ornament, natural size. It was obtained from a mound on Fain's Island, Tenn.

A large shell cross, the encircling rim of which has been broken away, is shown in Fig. 19. The perforations are still intact. The cross is quite plain. This specimen is very much decayed, and came to the National Museum inside of a skull obtained from a grave at Charleston, Mo. Beyond this there is no record of the specimen.

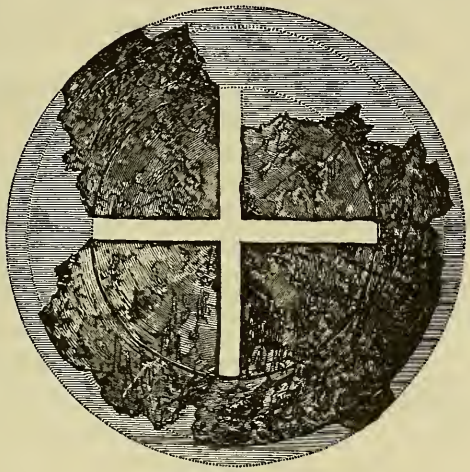

FIG. 20. Cross cut in a plate of copper, Ohio.

In Fig. 20 a large copper disk from an Ohio mound is presented. The specimen is eight inches in diameter, is very thin, and has suffered greatly from corrosion. A symmetrical cross, the arms of which are five inches in length, has been cut out of the center. Two concentric lines have been impressed in the plate—one near the margin and the other touching the ends of the cross. It is now in the Natural History Museum at New York.

Other examples of the cross obtained from the mounds could be added to this list—a few in shell and stone and many in copper. Examples of the Latin cross are rarely met with excepting in the

latter material and in silver; this is a significant fact. The Christian cross in all its forms abounds in the post-Columbian art of the American tribes.

DISCUSSION.

Professor THOMAS thought that a study of the Mexican hieroglyphs would help to absolutely explain the symbol of the cross in Mexico. The dots associated with the cross have reference to the days of the week. The east was always at the top, not to the right or left. The rings or circles signify cycles, and time is counted from right to left. The colors referring to the cardinal points are not persistent, as mentioned by Dr. Brinton.

An interesting discussion was continued by the various members present upon the forms of the cross as a symbol of Christianity, its origin, etc., after which Dr. HAGNER read a paper on "ORIGIN OF THE SEXES."

The discussion which followed was of a professional character, and various remarks were made and instances presented supposed to illustrate and support what has been termed the Law of Compensation in Nature.

The PRESIDENT then announced that this was the last meeting of the season prior to the summer vacation. He stated that the Society might look with gratification upon the past year's labors, and he took pleasure in announcing that the committee on publication would be in session during the summer in order to prepare volume II of our Transactions. After which he declared the Society adjourned to meet on the first Tuesday in November.

PUBLICATIONS RECEIVED.

The following publications have been received since the meeting of May 15th and prior to the printing of this volume:

From Prof. D. ANOUTCHINE.—Exposition des Sciences Anthropologiques. Société Impériale des Amis des Sciences Naturelles, d'anthropologie et d'Ethnographie de Moscou. 1878. Pp. 24.

——— Rules and regulations of above Society. 1881.

From Prof. G. CAPELLINI.—L'Età della Pietra nella valle della Vibrata. Bologna. 1871. 4to.

——— Armi e Utensili di Pietra del Bolognese. Bologna. 1870. 4to.

From Prof. G. CAPELLINI.—Grotta dei Colombi à l'île Palmaria golfe de la Spezia. Station de cannibales à l'époque de la Madeleine. Bologne. 1873. 8vo.

——— Matériaux utilisés par les Anciens Habitants de Felsina. Budapest, 1867. 8vo.

——— Les Grottes de Molfetta. Bruxelles. 1873. 8vo.

——— Les traces de L'homme Pliocène en Toscane. Budapest, 1877. 8vo.

——— L'uomo pliocenico in Toscana. Bologna. 1875.

——— Grotta dell' osteriola. Bologna. 1871–72.

——— Sur la découverte de la cassitérite en Italie, *n. d.*

——— Congresso Internazionale di Antropologia e di Archeologia Preistorica. VII Sessione a Stoccolma nel 1874. Bologna, 1874.

——— Congresso Internazionale di Archeologia Preistorica. IV Sessione a Copenaghen nel 1869. Bologna. 1870.

——— Congresso Internazionale di Antropologia e Archeologia Preistorica. Sesta Sessione a Bruxelles. 1872. Firenze. 1873.

——— Congrès Géologique International a Bologne. Guide a l'exposition Géologique et Paléontologique. Bologne. 1881.

——— Institut de Géologie et de Paléontologie à Bologne. Guide aux Collections. Bologne. 1881.

——— Bibliographie Géologique et Paléontologique de l'Italie, par les soins du comité d'organisation du 2me Congrès Géologique International a Bologne 1881. Bologne. 1881. 8vo. Pp. 630.

From Dr. H. FISCHER.—Ueber Steinschneidekunst der Alten. [Ext. from "Correspondenz-Blatt der deutschen Gesellschaft für Anthrop. Eth. u. Urg. Menschen."] 1883.

——— Archiv. für Anthropologie zu Braunschweig. Containing extended reviews of works by "Francisco Jimeno, Cuba, 1881," and "J. Barboza Rodrigues, Rio de Janeiro, 1875."

——— Ueber Babylonische "Talesmane," (Cylinder und andere Formen,) aus dem historischen museum im steierisch-landschaftlichen Joanneum zu Graz. Stuttgart. 1881. 4to.

——— Über Zinnerze, Aventuringlas und grünen Aventurinquarz aus Asien, sowie über Krokydolithquarz aus Griechenland. 1882.

——— Mineralogisch-archäologische Studien. Wien. 1878.

——— Notice sur la Distribution Geographique des Haches et outres Objets Préhistoriques. [Ext. from Revue Archéologique.] Paris. 1878.

——— Bericht über eine Anzahl Steinsculpturen aus Costarica. Bremen. 1881.

——— Also a number of miscellaneous papers and pamphlets.

From Count Giovanni Gozzadini.—Di Un'antica necropoli a Marzabotto nel Bolognese. Bologna. 1865. 4to. 20 plates.

——— Di ulteriori scoperte nell'antica necropoli a Marzabotto nel Bolognese. Bologna. 1870. 4to. 17 plates.

——— Congrès d'Archéologie et d'Ethnographie Préhistoriques, Session de Bologne. Discours d'ouverture, par M. le Comte Gozzadini, President du Congrès. Bologne. 1871. 8vo.

——— Nella Solenne Inaugurazione del Museo civico di Bologna, fatta il 25 Settembre, 1881. Discorso del Direttore Generale Senatore Gozzadini. Bologna. 1881. 8vo. 2 plates.

From Hon. J. Lewis Peyton.—History of Augusta county, Virginia. 1882. 8vo. pp. 395.

From the Author.—Les Temps Préhistoriques dans le sud-est de la France. L'Homme dans la vallée inférieure du Gardon, par P. Cazalis de Fondouce. Montpellier. 1872. 4to. 90 pp. 14 plates.

——— Les Temps Préhistoriques dans le sud-est de la France. Allées couvertes de la Provence. Par P. Cazalis de Fondouce. Montpellier. 1873. 4to. 32 pp. 5 plates.

——— Les Temps Préhistoriques dans le sud-est de la France. Allées couvertes de la Provence. Second Memoire. Par P. Cazalis de Fondouce. Montpellier. 1878. 4to. 64 pp. 7 plates.

——— Produit des Fouilles poursuivies a Durfort (Gard). Par M. P. Cazalis de Fondouce. Paris. 1875. 8vo.

——— Quelques Notes sur les questions relatives à l'Antiquité de l'homme. Par P. Cazalis de Fondouce. Montauban. 1875. 8vo.

——— Ébauche d'une Carte Archéologique du Departement de L'Herault. Par P. Cazalis de Fondouce. Montpellier. 1879. 8vo.

——— Action érosive du Sable en Movement sur des cailloux de la vallée du Rhone. Par P. Cazalis du Fondouce. Montpellier. 1880. Sm. 4to.

——— Emploi de la Callaïs dans l'Europe occidentale pendant les temps préhistoriques. Par Cazalis de Fondouce. Toulouse, 1881. 8vo.

——— La Question de l'Homme Tertiaire en Portugal. Par P. Cazalis de Fondouce. Montpellier. 8vo.

——— Sur les Défauts de Prononciation et leur Traitement; par M. le docteur Chervin. From Bulletin Hebdomadaire de l'Association Scientifique de France. Paris. 1883. 16 pp. 8vo.

——— Commission de Statistique Municipale. Rapport présenté par M. le docteur Arthur Chervin. 1883. 8 pp. 4to.

From the AUTHOR.—Sur un annuaire Démographique International. Par M. le docteur Arthur Chervin. Extrait des Annales de Démographie International. Paris. 1882. 4 pp. 8vo.

——— Étude des Résultats Généraux du Dénombrement de la population de 1881. Par M. le docteur Arthur Chervin. Extrait des Ann. de Démog. Intern. Paris. 11 pp.

——— Commission Consultative pour le Dénombrement de la Population. Mémoire présenté par M. le docteur Arthur Chervin. Paris. 1880. 44 pp. 8vo.

From the SOCIETY.—List of Palæozoic Fossil Insects of the United States and Canada. By R. D. Lacoe. Publication No. 5, of the Wyoming Historical and Geological Society. Wilkes Barre, Pennsylvania. 1883. 21 pp. 8vo.

From the AUTHOR.—L'Amérique Préhistorique. By Marquis de Nadaillac. Paris. 1883. 558 pp., and 219 ill. in text. 8vo.

——— Der Schädel Raphaels. By Dr. Hermann Schaaffhausen. Bonn. 1883. 4to.

——— Der Kiefer aus der Schipka-Höhle. By the same. Bonn. 1883. 8vo.

——— Die prähistorischen Kupfergeräthe Nordamerikas. By Dr. Emil Schmidt. 3 plates. Essen, *n. d.*

——— Kraniologische Untersuchungen. By the same. Essen, *n. d.*

——— Ueber die Bestimmung der Schädelcapacitat. By the same. Essen, *n. d.*

——— Mittheilungen aus der Anthropologischen Literatur Amerikas. 3 parts. By the same. Essen, *n. d.*

——— Ueber mexicanische Steinfiguren. By Prof. Dr. H. Fischer. Ext. from Festschrift der 56 Versammlung Deutscher Naturforscher u. Ärzte, &c. Stuttgart. 1883.

This Society is recognized by the Treasury Department as entitled to import books for its collection free of duty. In order that the officers of the customs may have no embarrassment in forwarding at once books so intended, persons sending them from foreign countries by mail or otherwise are requested to address—*The Anthropological Society of Washington, care of Col. F. A. Seely, Secretary to the Council, Washington, D. C., U. S. A.*

ANNUAL ADDRESS OF THE PRESIDENT,

J. W. Powell,

Delivered November 6, 1883.

HUMAN EVOLUTION.

THE SOURCES OF HUMAN HISTORY.

The story of human evolution is the essence of the history of mankind. Knowing what man is and does, the inquiry arises, How came he thus to be and so to do? The reply is history, and its sources will be briefly characterized.

I.—Geologic Records.

From the science of geology we learn that strata of rocks are constantly forming. The rains wash down the hills and deposit a part of the materials in the valleys and carry another part into the lakes and seas. During this process the bones and shells of animals are buried; and the bones of man and the implements of his art are buried with them.

There have been tribes of men who, unable to construct habitations for themselves, sought shelter in caves, where they lived and died, generation following generation. In such caves they gathered their rude works of art, together with the bones of the animals that furnished them food. Thus it came that the osseous remains of men, together with the works of their hands and the bones of the animals sacrificed to their hunger, were buried in the natural accumulations of the caves, and now they may be exhumed as subjects of study.

There have been tribes of men living on the banks of rivers or on the shores of the seas who brought to their rude habitations the denizens of the waters—the fish, the crustacean, and the mollusk. Within and without their dwellings bones and shells accumulated from year to year and from century to century. To such savage peoples this material was not offensive refuse, and so to them no

thought of removing it occurred. It therefore accumulated. As their simple dwellings were reconstructed from time to time, they still surmounted the accumulations gathered from the waters and the lands. By this process shell-mounds were raised, and in them were buried the bones of the land animals and of the birds of the air. From time to time the implements used by the people were lost and buried in the same refuse-matter; and sometimes these ancient peoples buried their dead beneath their houses. In such shell mounds, therefore, stores of valuable historic materials can now be discovered.

There have been tribes of men who buried their dead in the earth, and placed in the graves the possessions of the departed and many pious offerings, and sometimes erected huge mounds of earth thereon; and now skeletons, possessions, and offerings are exhumed.

There have been tribes of men who built their habitations over the waters of lakes, and these structures fell and were buried by lacustrine sediments; and now the ancient lake-dwellings can be studied.

There have been tribes of men who erected habitations on the flanks of slumbering volcanoes. Mountains heed not the welfare of man, and when the volcanoes were aroused men and their homes were buried. Under such formations the remains of man and the works of his art are entombed.

Tribes of men have made their homes under overhanging cliffs, using the natural caves of the rocks as part of their habitations, and constructing external walls of stone. Such cliff-dwellings have finally fallen into ruins, and have been more or less buried by the disintegrating rocks falling from above. Other peoples have built towns and cities of stone or clay, and the winds have drifted the sands over their ruins. From such buried cities valuable historic materials are exhumed.

II.—Designed History.

Whenever man has acquired a written language, of pictographs, ideographs, syllabaries, or alphabets, he has made records for a variety of purposes. This designed history not composed solely of accounts of what the writers themselves saw or what they learned from contemporaries, but it also includes what had been re-

ceived by tradition. Anterior to the development of writing, man exercised his memory in the preservation of history to a greater extent than now, so that historic events were transmitted from generation to generation by tradition with an accuracy of diction surprising to civilized man. This designed history is in many ways imperfect, being vitiated in part by ignorance and in part by design, as to a large extent the purpose of such history was laudation or the advocacy of measures. But, as much of history has been written by many persons, and the same events have thus been recorded from diverse standpoints of opinion and interest, critical comparative study reveals much truth.

III.—Undesigned History.

Since the invention of writing, very much of history has been undesignedly recorded. Early records of this class are largely poetic. Many deeds designedly told have been rhetorically illustrated by fragments of history—statements of facts in which the writer had no motive for misstatement but all motive for the expression of the truth. Such history appears under a variety of forms—mythic accounts of creation, accounts of the ceremonial institutions of religions, and narratives of the adventures of heroes, into which are woven statement of the manufacture and use of weapons and other instruments. Accounts are given of the councils of people, in which the statements made by persons taking part therein recount the doings of their ancestors; and one of the earlier uses of writing was that of recording codes of laws by which societies were regulated. All of these records undesignedly written as history prove to be of the greatest value to the scientific historian of the present epoch. The records themselves are not vitiated. Their value depends on sound interpretation.

IV.—Comparative Statics.

The study of mankind as he is, without reference to what he has been, is sometimes called Social Statics. When we learn what man is and does, as he is represented among civilized, barbaric, and savage nations and tribes, and compare the statics of each society with every other, and arrange them in order from the lowest savage tribe to the highest civilized nation, it is discovered that a series of conditions appears, parallel to the series of conditions derived from

geologic records, designed history, and undesigned history; so that the history of the progress of any people from savagery to civilization is found to a large extent similar to an account of existing peoples, beginning at the lowest and passing to the highest. When the scientific historian is in doubt about the course of events among the people whom he is investigating, he turns to comparative statics to discover what it teaches as a guide to his researches. In like manner the student of comparative statics finds corroborative evidence of his truthful conclusions in the writings of the scientific historian.

Such, in brief outline, are the sources of history. From them an intelligent account of the progress of man, from an early period of his existence upon the earth until the present time, has already been derived. True, all is not known. The future scholar will discover that what is now written is imperfect; but that which is known is of profound interest, and contains lessons for human welfare that mankind cannot ignore.

THE EARLY CONDITION OF MAN.

From the geologic record it is ascertained that man lived in late Tertiary times. In early Quaternary time he is found widely scattered throughout the earth, for his bones are discovered in the Tertiary or Quaternary rocks of every continent. By the laws of evolution, now postulated in all sound scientific research, it is inferred that he existed as a highly differentiated animal long anterior to that time, and it is confidently believed by anthropologists that geologic research will eventually demonstrate this inference. Be that as it may, man was widely distributed in the first part of Quaternary time. Now, science has not yet established a method for measuring geologic time in the units of recorded history—in years, though some attempts of this character have been made, and important conclusions have resulted therefrom. It is sufficient here to say that Quaternary time must be measured by scores, or hundreds, of thousands of years. The remains found exhibit the fact that at such time as they were deposited the human beings to which they belonged were highly developed as compared with the most advanced of the lower animals existing at the present day, and yet that they were less advanced than the lowest of men existing now,

and much lower than man in his highest estate. All this comes from the geologic record. In the same manner the comparative anatomy of the peoples of tribes and nations still existing exhibits the fact that savages are physically much more like the lower animals than are civilized men.

In geologic formations of the same age as those in which the first human remains are found, many implements are discovered, fashioned by man and used by him for a variety of purposes. These tools, in the materials of which they are made, in their fashioning, and in their uses, exhibit a very low state of culture, for we here discover the very beginning of the arts in the use of rudely shaped stones, fragments of bones, and shells. Now these rude works of art—stone hammers, stone celts, shells and fragments of shells, bones and fragments of bones—are scattered everywhere throughout the habitable earth, and therefore it is certain that when man began the invention of arts he had occupied the whole earth.

In the study of the institutions of mankind, it is discovered that as we go backward in the recorded history of the civilized races, or go downward in the scale of peoples from civilization to savagery as these peoples exist as tribes and nations upon the earth, such institutions, through which society is organized and regulated, have passed through a series of stages, such stages becoming more and more simple as we go backward and downward. First it is noticed that the structure of bodies politic, *i. e.*, the plan of organization, changes by becoming more simple and by presenting characteristics which manifestly include less and less numbers in each corporate body or state, be it national or tribal; so that the earliest forms of states, from the very nature of their structure, could not include large bodies of people. As we pass back in civilization the smaller becomes the nation. As we still pursue our investigation through barbarism into the lowest savagery, the smaller becomes the tribe. This leads to the conclusion that in the early history of mankind there was a vast multiplicity of tribal states.

The condition of primitive man is also discovered in the study of languages. In the early history of philologic research it was assumed that the thorough study of languages would result in tracing them to a common stock. For a time, as the languages of the more civilized peoples were studied, this earliest hypothesis rapidly gained credence, from the fact that the languages of the more

civilized peoples were thus traced to a common stock—the Aryan. But, as research was widened, and the languages of more diverse peoples were studied, new groups were established on as firm a basis as that upon which the Aryan rests. As investigation progressed from decade to decade, these stocks of languages rapidly multiplied, so that a very great diversity of original stocks or families of languages is now recognized. But there is yet a further stage in this line of research. It is shown that every such group of languages in the course of its history borrows to a greater or less extent from others. Sometimes this borrowed material can be traced to other stocks known to exist. Much of it cannot be thus traced, and it becomes highly probable that many linguistic stocks have been so far lost that only these fragments, these waifs of language, remain to give hints of their existence. It is thus shown that languages have had a multiplicity of origins; and it is further shown that languages, in the earliest stages of which we have knowledge, were very imperfectly organized—that is, they were very crude tools for the communication of thought.

A philosophy is a system of opinions concerning the phenomena of the universe which the people entertaining such opinions have observed. If we take the history of any civilized people from the earliest record to the present time, it will be observed that the philosophy of such a people has changed in every stage of progress. If, on the other hand, the philosophies of different peoples, civilized, barbaric, and savage, are studied, it is discovered that the course of evolution observed is parallel with the series of philosophies obtaining among existing peoples. Certain important characteristics are observed in these philosophies; namely, that the philosophies of civilized peoples are highly unified; that as we go backward in their history they become more diverse; and finally, when we study the earliest philosophies, together with the philosophies of the lowest tribes of mankind, we discover that there is a vast multiplicity of systems of opinions; that each such system of philosophy becomes the supposed explanation of the phenomena of a small district of country which was to some little tribe the whole extent of its universe. In this manner it is discovered that in the earliest stage of opinions there was a vast multiplicity of philosophies.

It will thus be seen that from five great co-ordinate departments of anthropology, *i. e.*, from somatology, or the biology of man;

from technology, or the science of the arts; from sociology, the science of institutions; from philology, the science of languages; and from philosophy, the science of opinions, we arrive at the common conclusion that man was widely scattered throughout the earth at some early period in his history in a very low state of culture; that in such state he utilized the materials at hand—the loose stones of the earth, the bones scattered about, the shells stranded on the shores, the broken trunks and branches of trees, and whatever would most immediately come to hand without ingenuity and without toil. And we further discover that he was organized into small tribes, doubtless scattered by every bay and inlet of the seas, along the shores of all the inland lakes, on every bend of the great rivers, and on every creek of the habitable earth. Man thus scattered had not yet acquired organized speech. Doubtless he had rude language, or he could not thus have spread through the earth, the lord of the fowl and the brute; but organized oral speech began at a multiplicity of centers, with each little tribe of the earth. With speech, into which opinions could be molded, began the growth of philosophies. Arts, institutions, languages, and philosophies have therefore a vast multiplicity of origins, and in tracing the outlines of their history we trace the change from multiplicity toward unity.

Before proceeding to describe the nature of this change it will be well to take a general glance at man as an animal. It appears that at this early time, as man was spreading from some center throughout the earth, the laws of biotic evolution were in force, and there had resulted therefrom much biotic specialization, for man was yet but the highest of animals. This specialization had resulted in the establishment of varieties, exhibited in the color of the skin, the structure of the hair, the position of the eyes, the conformation of the cranium, and other biotic peculiarities. Had the laws of biotic evolution continued paramount, it cannot be doubted that these varieties would steadily have become more and more pronounced, and the genus *homo* would ere this have included many species. But through the evolution of arts, institutions, languages, and opinions, the laws of biotic evolution, though perhaps not absolutely repealed, were superseded by other methods and laws which changed the course of man's progress. By the spreading and admixture of activities, and by the concomitant admixture of streams of blood varieties were prevented from becoming species. The tendency

to heterogeneity of species was checked, and a tendency to homogeneity was established.

Having thus briefly set forth the early condition of man, it is proposed to describe the course and method of human evolution thenceforth. Up to the time which we are now considering, man's history was the history of the animal man, but when man became superior to the lower animals his course of progress depended no longer on the laws of biotic evolution, namely, the survival of the fittest in the struggle for existence, through the fact that by reason of his superiority he no longer came in competition with the lower animals; he then used animals and plants alike for his own purposes. A new method of evolution arose. Animals under the laws of biotic evolution were adapted to the environment; man, through his activities, adapted the environment to himself; and through these activities men became organized; and thus there is a third kingdom of matter, of which the science of anthropology treats. The origin and nature of these activities will now be set forth.

THE GENESIS OF ACTIVITIES.

The Mind.

In biotic evolution a special organ is developed to regulate the interdependence of the other organs as they perform their functions for a common purpose—the welfare of all. This organ, itself a complexity of organs with differentiated functions, becomes also the organ of communication between the individual and his environment. At first the means of communication are tactual. Out of the general tactual sense the more specialized sense of taste is differentiated, having a limited set of nerves for its organs. Another differentiation of touch is the sense of smell, by which certain properties of exceedingly minute bodies, emanating from larger, are perceived. Then comes another differentiation of tactual perception, in the evolution of an organ so delicately constituted as to detect minute vibrations of the air—the sense of hearing. And finally an organ of tactual sense is developed, so exceedingly delicate as to perceive those vibrations of the ether called *light*. Thus the five senses are differentiated out of the general tactual sense, each having more highly specialized organs in the order in which they have been named.

As the functions of biotic organization are performed through the transmutations of matter and motion and the passing on of the constituent matter from one stage to another until it entirely passes from the living body, having been replaced from stage to stage by new constituent matter, the impressions which the senses receive from the exterior are imposed upon the structure, as the old leaves and the new takes it places. In this manner each minute structure within the body is in part the same as the antecedent structure and in part changed therefrom by the force of impressions from without. It is in this manner that impressions are recorded, so that the structure itself is a product of all co-existent and antecedent agencies. Out of this arises Memory.

First, then, an organ is developed for receiving impressions from without, to be used in regulating the functions within; and this becomes highly specialized, so as to receive a vast multiplicity of impressions. Then, by reason of the nature of vital functions, a record of such impressions is preserved, and mind results therefrom. Objective impressions are transmuted into subjective sensations and perceptions. Mind weaves them into emotions and thoughts, and men are thereby propelled into other activities. An organ or system of organs for the mind is discovered, more or less highly developed, in the lower animals, but its great development is found in man. The science of the mind is Psychology.

The Arts.

In the biotic kingdom activity first appears among plants, and its inception has been denominated *Circumnutation* by Darwin, the greatest of biologists. Then follow various movements, all of which are usually included under the general term Sensitiveness, exhibited in a great variety of ways among plants. This effort of the plant, under varying conditions of environment, to gain the advantages of the more favorable, results in movements that are here called *Activities*. It is thus that plants become actors.

Activities of a higher order appear among animals. Such as are fixed reach out their tentacles for food; such as are free have locomotion, and they seize their food as do fixed animals. In this manner animals become subjects, or actors, doing that which they will or design. They seek shelter from the storm, or purposely bask in the sunshine. Then they prepare shelters for themselves,

provide ways or devices for procuring food and for escaping dangers, and in a great variety of ways perform acts.

In doing such acts animals are said to *work*—they perform operations. But in passing from the lower animals to mankind we find that these operations are greatly multiplied and diversified. This arises primarily from a higher differentiation of the human organisms. Through arboreal life and the activities concomitant therewith, under the well-known laws of specialized development, hands were evolved—special organs for operative functions. Thus, out of biotic function were evolved those activities which will here be denominated *Operations;* and the evolution of operations is the evolution of art. The science of the arts is Technology.

Institutions.

Low in the scale of animal life bilateral symmetry appears. The lower animals are characterized by a multiplicity of like organs for the performance of the same functions. In the loss of this multiplicity and the development of special organs for special functions, there were gradually evolved duplicate sets of organs performing like functions. These duplicate organs are so adjusted as to render each other important assistance. Not all the organs are thus duplicated. In general it may be said that those specially engaged in alimentation are single. Those whose functions mainly relate to activities in the external world are double and co-operative. Vision is greatly facilitated by duplicate eyes, hearing by duplicate ears, manual operations by duplicate hands, and locomotion by duplicate feet. To an important extent, therefore, the animal organism is an association of two sets of like parts, co-operating for common purposes. The next step in the higher organization of animals is also biotic. This consists in the differentiation of the individuals of the species into male and female for bi-sexual reproduction. Without this peculiar biotic differentiation the individuals of the species would have been discrete. Each individual would have been the competitor of every other, and there would have been no genesis of co-operative association; but bi-sexual differentiation became the basis of co-operation at the foundation of life. Having thus become associated into more or less coherent groups, there were gradually developed therefrom co-operative activities in many ways. There was co-operation in obtaining food, in securing shelter, in

warning from danger, in destroying enemies; and this process in the evolution of association has continued until many, perhaps all, of the more highly organized animals have acquired social institutions more or less crude.

Among some of the lower animals a further biotic differentiation progressed *pari passu* with a further specialization of activities. This is seen curiously exhibited among bees and other species of the articulates; so that their higher social organization is a concomitant of biotic differentiation. But among the vertebrates biotic differentiation did not proceed further in conjunction with operative differentiation. Along with the differentiation of operations a special class of employments sprang up, having as their function the regulation of the conduct of the individuals associated. This was the inception of government. Government, then, is the specialized activity of regulation. In a crude manner, and to a limited extent, many of the species of the lower animals have developed this specialization of operations, and have further developed the rudiments of that special activity here known as *Government.* But the operative activities have their highest development among mankind. Through them society is organized by the differentiation of many arts and the establishment of interdependence therein, and especially by the growth of the operative activity known as Government, by which all other operative activities are regulated. This gives the science of Sociology.

Language.

In the biotic process of evolution the senses were developed, and by them more delicate communication between the subject and the environment was established. In the association of individuals which arose from sexualism this delicate communication between the individual and the environment was further developed into communication between individuals. The biotic organism, through its most highly developed organic part—the nervous system—having become able to perceive the characteristics of the natural environment which immediately affected its own existence and welfare, became competent also to interpret certain of the characteristics or attitudes of the individuals of the environment with whom there was constant association; and individuals perceived that their own attitudes were thus discovered by changes effected thereby in the

attitudes of others. In this manner, by minute increments of knowledge, each learned something of the other with whom he was associated, and each learned to communicate with the other, *i. e.*, to assume attitudes designed to influence the other. Through this intercommunication language was developed. The senses became the passive organs of language. Attitudes of the body developed into gestures, and sound-making into oral speech, and the active organs of language were specialized; and finally, oral speech to a large extent superseded gesture speech. Languages are developed among the lower animals, but their chief development appears among mankind, and by it men became associated in thought. The consideration of these linguistic activities belongs to the science of Philology.

Opinions.

Combined and compounded thoughts produce opinions. Through the evolution of language, opinions are transmitted from individual to individual, so that the perceptive experiences of one come to be the common property of many. Through the law of heredity, opinions, or the elements of which they are composed, are transmitted. Opinions, therefore, are derived from ancestors, from personal experience, and from the experiences of others communicated by language. Through all of these processes opinions rapidly multiply, and by their interaction they are changed in quality. Organized opinions are philosophies. A few crude opinions are held by the lower animals. They come to believe that certain things will do them harm, others good; that certain attitudes of living beings are indices to their intentions. But a much higher development of opinion is discovered among mankind. The science of opinions is called Philosophy.

It will thus be seen that five great classes of activities are recognized, under which all human actions may be grouped. In the first are embraced the activities of the Mind in transmuting objective impressions into subjective sensations and perceptions, and the compounding of the elements of thought into the formation of opinions. In the second are embraced the operations of mankind in supplying his wants. These are the Arts. Third, the activities of mankind that lead to the organization of societies. These are the Institutions. Fourth, the activities of intercommunication be-

tween mind and mind, embraced under the general term Language. Fifth, the activities of the mind in combining the more simple opinions into the more compound, producing Philosophies.

Thought has necessarily been used as the name for units of different orders. The term *opinion* has been used in a like manner. The ultimate product of thought is opinion; the ultimate product of opinion is philosophy. In the same manner *institutions* and *arts* are each used to designate units of different orders. Psychic activities are subjective, being states of the mind; objective activities produce arts, institutions, languages, and opinions. All have their genesis in biotic functions. All are observed among the lower animals. All receive their highest development in man. In their evolution they act and re-act upon each other, so that in their progress there is an ever-increasing interdependence. Through their evolution the biotic organs on which they are dependent are developed, or specialized, by exercise. The evolution of mind, therefore, is dependent upon and proceeds with the evolution of arts, institutions, languages, and opinions, and its history is their history. The course and methods of anthropic evolution must be ultimately sought in the history of activities.

The doctrines of biotic evolution are now woven into the speech of common life. They need not here be recapitulated. The evolution of man up to the time of his acquisition of organized activities is fully set forth in those doctrines. Since that time the course and method of his evolution have been radically changed.

EVOLUTION OF ARTS.

The arts of mankind begin with the utilization of the most accessible materials in the natural environment. Clubs are made of wood, various instruments of percussion of stone; shells are used as domestic utensils, and the skins of animals as clothing. Then man learns to fashion his clubs, to fashion implements of stone, bone, and horn, and to add to his utensils of shells plaited woodwork, as trays and baskets. Then he learns to fashion and bake clay for domestic utensils. Such rude arts began at innumerable centers, at every home of a primordial tribe; and the arts at first, arising from utilization of the materials immediately at hand, were controlled by the immediate environment. Tribes living in forests made shelters of wood, and improved them from time to time.

Tribes living in more arid regions, where wood was scarce and rocks were scattered upon the surface of the earth ready to hand, made their first shelters, and subsequently their more highly developed habitations, of stone. Tribes that lived on the fens of rivers and the low shores of lakes utilized reeds as the materials for their shelters and habitations. In a multitude of ways this fact could be illustrated, that the most accessible materials in each center of the development of arts controlled at first the nature of the arts themselves. From this condition progress was steadily made, in using first the materials and secondly the powers of nature, until multitudes of arts sprang up. In the arts of sustentation, from hunting, fishing, root-digging, and the gathering of fruits and seeds came agriculture. Then followed the domestication of animals, and finally man employed beasts of burden. In the arts of transportation by water, first logs and rafts of logs and rafts of reeds were used. Then logs were hollowed for boats, and reeds were constructed into similar craft, and boats were made of bark. At first boats were propelled by paddles, then by oars, and then by sails. And finally beasts of burden came to be extensive agencies for transportation. Then trails became highways, and then first some tribes became nomads. The story would indeed be long were it all told; only the briefest illustrations are necessary.

In the early history of the arts tools were used, and tools developed into machines as device was combined with device. Tools and machines are used in art operations, such as agriculture, house-building, cloth-making. Each operation or distinct art is composed of processes, and each process has its corresponding tool or machine. With the evolution of implements, composed of tools and machinery, there is an evolution of processes—the functions of machines; and through the evolution of processes and implements the arts themselves are evolved. As processes and machines have gradually become interdependent in each art, in like manner interdependence has been established among all the arts. Agriculture has become dependent upon manufactures for agricultural implements; manufactures have become dependent upon mines for the materials used therein; agricultural arts, manufacturing acts, and mining arts have become dependent upon the arts of transportation to bring the materials together and scatter the products to the places where they are to be used. There is thus established among all arts throughout the civilized world a

vast plexus of dependencies, so that the operations of each art are dependent upon the operations of other arts; and with every differentiation of a new art the interdependence increases.

Thus it is seen that man in his invention has developed the arts. In the course of invention each artifice has been the prelude to some other artifice, each process to some new process. Each device with its process is a step in an ascending series. As better processes and implements are invented, old processes and implements are discarded. The good is constantly being replaced by the better, and the better by the best. The better is chosen, the worse rejected. A pyschic activity of choice intervenes, and the method of progress by human selection is established as distinguished from natural selection. Thus again we have a survival of the fittest; and it should be noticed that it is a survival of the objective art, not of the subjective artist. Progress in the arts, therefore, is made by human invention and selection, and the invention and selection alike are the work of—not one man, but all men.

Man in his highest estate in modern civilization has developed a vast multitude of arts, and through them he controls the natural environment in such a manner that no longer is he beaten by the winds and driven by the storms and starved by the deserts; no longer is he the abject creature of physical changes—the environment is now controlled by himself. Being an actor, he determines his own progress and is master of his own destiny.

All the arts are man's inventions—not of any one man, nor of a few inventors appearing at long intervals from time to time as great benefactors, but all mankind have been inventors. The body of arts to-day existing in civilized society has grown up by minute increments, from the days of the club and the shell to the days of the engine and the loom.

As the arts are expressed in material nature they can be easily imitated and learned. From their very nature they readily spread from man to man, from tribe to tribe, and from nation to nation. Again, as arts are developed for the purpose of supplying the wants of man, the impulse to imitate and borrow is the most pressing. Whenever arts have been developed they have rapidly spread, so that that which one man has done has been a boon to many, and what each man has done has been a boon to all. It is thus that the whole world is engaged in the invention and spread of

the arts; and when we contemplate their vast development, the extent to which man has gained control over the materials and powers of nature, the magnitude of the result is equaled only by the magnitude of the agencies that work therein. The arts are the inventions of all mankind, from the days in which man lived in equality with strange beasts that have perished until the present when the earth is embellished by his hand. Art is the product of all labor through all human time.

EVOLUTION OF INSTITUTIONS.

As the simple arts with tools and processes developed into the complex and compound arts with machines and operations, men engaged in these labors were thereby made interdependent. Each one became dependent upon many others for the successful prosecution of his own calling. Farmers became dependent upon manufacturers for machines, manufacturers upon miners for materials, miners upon farmers for food. In every stage of the progress of art, man becomes more dependent upon his fellow-man. The shoemaker can use shoes directly to supply only a single want, but, in the complex conditions of life which have been evolved, he has a multitude of wants, which press upon him at every hour of the day, and for the supply of each one he is dependent upon a multiplicity of other men, who are dependent upon him through the want for shoes. And so all civilized men are bound together by a plexus of cords, each one a want, and every man's happiness is dependent upon the happiness of others.

But while the dependence of man has been steadily increasing from early savagery to high civilization, his authority over other men has in like manner been increasing. While he is subject to other men by reason of his wants, other men are in like manner subject to him by reason of their wants. Man is therefore steadily becoming more and more a master and more and more a servant. With every stage in the progress of art, interdependence is increased. Thus men have become organized as arts have become organized.

With all this indirect organization arising through the arts, there is a direct organization arising through institutions. In the process of this evolution mankind has become associated into groups on various plans. The association of a group of individuals for any purpose whatever gives rise to an institution.

The primary grouping of mankind has its foundation in the biotic differentiation of the sexes, giving rise to the institution of marriage, or co-operation for reproduction. This first group is composed of husband and wife, parents and children. Added to the biotic differentiation of functions is the anthropic differentiation of activities. Here is discovered the first division of labor; for while by necessity the wife and mother has the immediate charge of the offspring, the husband and father has the indirect care of mother and children in providing food and shelter therefor. It is only by a vague inference that the characteristics of this institution in its earliest form are known; but it seems probable that the association of individuals in marriage was more or less ephemeral, continuing for longer or shorter periods entirely at the will of the individuals immediately concerned. Be the beginning what it may, the later history of the institution is well known, and some of the important facts relating thereto will hereafter be set forth.

When a group of individuals engage in dancing, their actions are correlated, and an organized dance—for example, a cotillion—is an early form of institution. Such an institution is exceedingly ephemeral, as it lasts only while the activity is in progress; but it becomes more permanent in very early societies, as dancing associations are formed. Such associations are composed of members who cultivate a particular dance, and who meet from time to time for the prosecution of the activity from which they derive a pleasure, and which to them has a mythic significance. These institutions are very common among the lower tribes of mankind, and constitute an important element in the structure of the tribal state.

In early society it is discovered that associations are formed for hunting. Groups of men engage in this activity by enclosing game and driving it to a central position as the members of the group themselves converge. Among many tribes pitfalls are constructed and winged barriers of logs, brush, or rocks adjusted thereto, to aid in guiding the driven game. For smaller animals nets are constructed, as snares into which they are driven. Such an association is an institution in its most primitive form and may be quite ephemeral, lasting only for a single hunt. But pitfalls, barriers, and nets may be used again on the same field, as from time to time during the season, and from year to year, the institution is revived. Then the individuals who take part therein often become more permanently organized into societies,

so that there will be a society for the hunting of the buffalo, another for the hunting of the deer, another for the hunting of the rabbit.

In like manner institutions for the practice of occult medicine arise. Medicines or charms are prepared with elaborate ceremonies, and virtues are implanted therein through the use of mysterious words accompanied by dancing, singing, and the performance of strange rites. Sometimes the association for this purpose is ephemeral, but usually it is found that permanent societies are organized, each having the care of the systematized rite and the custody of the medicine.

So institutions for the practice of religious rites and the performance of religious duties arise in early society, and continue on in various forms through civilization. Institutions for the prosecution of war are also organized. In early history war parties are societies. By their further development armies are organized.

As man progresses, institutions multiply. In a variety of ways men are organized into groups, or bodies politic, in each case for some specific purpose. Farmers organize agricultural societies, mechanics organize trades-unions, manufacturers organize their associations. Then those bodies usually denominated *corporations* spring up, and groups of men are organized to prosecute a specific industry, as a gas company, composed of stockholders, officers, superintendents of various grades, and employes. Schools are organized, composed of principals, teachers, and pupils. Churches are organized with a hierarchy of officers and laymen. In a vast multiplicity of ways these institutions spring up, and the same individual may become a component unit in many institutions. For convenience, all such institutions as have been here described, and which are designed to promote the prosecution of some enterprise, will be called *Operative Institutions*, to distinguish them from the class next to be described.

There is a special class of institutions that arise among men, designed for the regulation of conduct. The institution of marriage gives rise to the institution of the family. The necessary elements, parents and children, constitute a group of persons, and for their association authority and subordination are established. In the early history of society such groups coalesce into larger groups. Thus a group of brothers marry a group of sisters. The men are common husbands to the women, who are wives in common. Their

children call one another brother and sister, though they may be but half brothers and half sisters or cousins. In order that men may live together in such a body politic there must be some method for the regulation of conduct, and this regulation is accomplished by the establishment of authority and subordination, upon the basis of relative age; and in early languages a peculiar linguistic device springs up by which relative age is expressed in the terms of kinship by which the individuals of the body politic address one another. In these larger bodies regulation applies only to those particulars that lead to disagreement. It appears that the first sources of disagreement arise from the marriage relation. Men desire more or other wives, women more or other husbands. Discovering that the conflicts arising therefrom lead to the destruction of happiness, plans are made by which such disagreements may be obviated. A body of people geographically contiguous, and united by a common but crude language and by common but crude operative institutions, segregate into groups. The men who hold their wives in common and the wives who hold their husbands in common establish an institution by which their children may more effectually avoid conflict and be more thoroughly organized for mutual assistance. This is done by segregating the children into groups—two or more groups of young men and two or more of young women. Then these groups are related to each other by rules or laws established by the elders, to the effect that one group of young men shall call one another brothers, and shall have a group of the young women as their wives in common. The sisters of the young men shall be the wives of another group, that second group being the brothers of the wives of the first. Thus the little tribal state is bound together by ties of affinity and consanguinity. Now this plan of structure of the early tribal state develops in many ways, through many curious institutions of marriage and of the family; but always in the early history of mankind the body politic is based upon kinship.

The later forms of this political structure appear in the clan or gentile organization exhibited among the Indians of North America and many savage and barbaric peoples elsewhere throughout the globe; and it appears among our own Teutonic forefathers. Perhaps the gentile organization had its highest development among the Greeks and Romans. This kinship structure of society was well adapted to peoples scattered widely throughout the earth, each

having its own language, and to a greater or less extent its own system of arts and operative institutions. An important characteristic here to be noted is that it is adapted only to small bodies of men, who are able to keep in memory and recognize all the individuals belonging to the state, and to address them by their proper terms of kinship.

The highest form of this society in its simplicity is the patriarchy, and through it ancestral worship is established. In all the history of kinship society the course of progress is such that classes, clans, gentes, and higher groups of these are differentiated and integrated always to one end, namely, that a larger body of people may be brought into one regulative institution or state.

At last kinship society broke down; it no longer served the wants of the people as a method of organization; and slowly with its collapse a new system of organization was developed—that based upon property; and as land was the most important property, states came to have a territorial organization. So tribe coalesced with tribe, and nations were organized; and through barbarism, which is the transition state, savagery developed into civilization, tribes into constitutional nations.

The evolution of "Operative Institutions," as they have been denominated, will here be neglected, and attention will be called exclusively to the course and method of evolution of Regulative Institutions.

Under these institutions we have to consider: the structure of the state, the constitution of the government, and the principles of the law.

The progress of evolution in the state is marked by a steady differentiation in the divisions thereof, and a relegation to each of some distinct function of government. On the other hand, the evolution is characterized by progressive coalescing of tribes into larger tribes and into nations, and of nations into larger nations.

In the evolution of government there is to be observed a progressive differentiation of function, as legislative, executive, and judicial; and in each of these great departments of government secondary and tertiary differentiations occur, while the whole system of government progressing from low tribes to highly civilized nations is marked by progressive integration in the establishment of relations of interdependence.

In like manner the law, composed of the rules of conduct which organized society endeavors to enforce, is evolved.

The course of the evolution of the state, the government, and the law was set forth much more fully in my last address to this society, and for that reason the subject will be neglected here; but the essential point to which all this explanation is directed is this: regulative institutions have been developed by mankind in the struggle to secure peace.

In order that men may live together in peace and render one another mutual assistance, institutions are invented. This is their purpose. The endeavor to secure peace has been by two parallel methods. The first is by the invention of institutions to terminate controversy, the second by institutions to prevent controversy; and while the two systems are never fully differentiated, the two ideas may always be discovered in the regulative institutions of a people.

In primitive society the institutions designed to terminate controversy are exceedingly crude, as a few illustrations will exemplify.

Among many tribes controversy must end at the Day of Jubilee. Again, if parties have resorted to personal conflict, controversy must end therewith. Thus results trial by duel. Trial by ordeal has a similar origin. It is simply, in its most primitive form, trial by lot, around which in time gather many ceremonies and religious sanctions.

Among the Muskokis, if a member is guilty of certain breaches of good conduct, complaint is made to the patriarch of the gens, who considers the case. By a curious legal fiction crime in these cases consists in conduct which transgresses the teachings of the patriarch. Therefore, when he considers the case he renders his decision by simply stating that he has or has not previously instructed the accused person not to do the things of which he is accused, and punishment is given or withheld accordingly, and controversy must end therewith. The law in such matters is manifestly composed of the teachings of the patriarch.

The endeavor to secure peace leads, through the centuries of history, to the recognition of the more delicate phases of justice, and especially to the methods of obtaining and weighing evidence, that the facts in controversy may be clearly understood and the decisions be based upon facts, and justice rendered thereby. So it has been in all the multitudes of tribes that have inhabited the earth. Every event in the history of a tribe which has caused serious disagreement or a breach of the peace, has been the subject-

matter of controversy by such a people. Around their camp-fires, in their council-lodges, in rude underground chambers where justice is administered, as well as in temples of justice where august courts deliberate—everywhere, human conduct has been the subject of discussion and deliberation. As the last product of all this endeavor there have been evolved codes of law and systems of jurisprudence. When we contemplate the struggle between passion and passion, between man and man, and the deliberation of the wisest and best of mankind among all peoples through all the period of the existence of society, we are filled with astonishment at the magnitude of the endeavor to establish justice. The vast systems of jurisprudence in the civilized world result from this endeavor.

But man has ever attempted to secure peace by preventing controversy. From time to time, as he has passed through the various stages of social progress, the immediate questions about which controversy has arisen have been the subjects of contemplation, and men have devised and counseled with one another in rudely or highly organized deliberative bodies for the purpose of formulating rules of conduct to secure peace, and this invariably ends in the consideration of the justice of rules of conduct. In the earliest forms of society the vigorous and able-bodied men, and sometimes women, meet from day to day or from time to time in council for the purpose of discussing conduct and establishing rules therefor. All along the course of the history of man we find that he has been thinking upon the characteristics of conduct that would secure justice, so that justice has been the subject of his thought everywhere and at all times. The forests of the world have echoed the eloquence of savage and barbaric orators as they have pleaded for justice. It is indeed impossible for the human mind adequately to comprehend the amount of thought and endeavor which has been put forth for the development of the modern structure of the state, the modern constitution of the government, and the modern system of jurisprudence; and it has all been the work of man—not of one man, but of all men.

THE EVOLUTION OF LANGUAGE.

Language is the agency by which men have been interrelated through the communication of thought. In the course of its evolution gesture-speech has gradually been replaced by the more highly organized oral speech; and finally written language has been based

thereon by representing to the eye symbols of that which is spoken to the ear. To a very large extent, in its earliest history, language was addressed to the eye. It then became chiefly addressed to the ear; and at last the eye and ear alike become the passive organs of speech.

For the present purpose, only oral language will be considered. It may be represented as composed of distinct sounds, each a syllabic emission. They are themselves complex, but they may be considered as the units of which speech is compounded. A few simple devices appear in the use of these syllabic sounds to express thought. First, syllables may be combined—two or more put together so that they coalesce in one word, or two or more words may be united to form one. This is the device of *Combination.* Second, the same particular syllable or word may be used in combination with many other words, in each case for the same or nearly the same purpose. Thus a particular syllable denoting time may be used with many words denoting action to give a time or tense qualification thereto. Often these added words or syllables become greatly worn, so that the orignal form is obscured or lost. There is a tendency to use such particular words in their original form, and more especially in their worn form, to a greater and greater extent as time progresses—that is, words in which they were not originally used come to have them attached by assimilation. For example, the past tense of *love* is *loved*, and it may be often noticed that children will use this same past tense with *go*, forming it as *goed* instead of gone. Thus, by wearing down of originally combined syllables and words, and by assimilation, systematic inflections are produced, and this device is called *Inflection.* Third, the syllabic units of language, as they have been described above, are composed of vocalic and consonantal elements. In some languages a mutation of the vocalic elements takes place. Thus in English, *man* in the singular is changed to *men* to express the plural; *run* is changed to *ran*, and *lead* to *led* for tense. This method, used to a very limited extent in English, becomes an important element in the structure of some languages, as the Hebrew. Sometimes, like inflection, it is but a modified form of combination; perhaps it is always so. Be its origin what it may, in some languages it comes to be a clearly differentiated device. It is called *Vocalic Mutation.* Fourth, the words thus constituted may be arranged in some order, so that such order

itself shall be expressive. This is beautifully illustrated in the case of the use of the figures of the Arabic notation, where the place of the figure is significant. This is the device of *Arrangement*, which I have elsewhere called *Placement*. Fifth, syllables and words may be expressed with peculiar intonations, such for example, as rising and falling inflections. In the English language intonation is chiefly used for rhetorical purposes; in some other languages, especially the Chinese, it is used to a much greater degree, and for other purposes. This is the device of *Intonation*. Sixth, particular words may be uttered with greater force than others for the purpose of calling attention to important ideas. This is the device of *Emphasis*. Seventh, stress may be laid upon particular syllables in words, and thus particular meanings may be given thereto. In English this is often done to differentiate parts of speech, as in rébel, the noun, and rebél, the verb. This is the device of *Accent*. In most languages combination and arrangement are the chief devices.

In the lower languages combination is chiefly used, and for a variety of purposes. Usually each syllable conveys a distinct idea, and by combining several syllables many ideas are expressed in one word. Such words, therefore, are not distinct parts of speech, but combinations of one or more. For example, in many languages there is no distinct word for *father*, but a word signifying *my father*, another *your father*, etc.; that is, a noun and an adjective pronoun are combined in one word. Again, there is no distinct word for *brother*, but a word for *my elder brother*, another for *my younger brother*, &c. Thus three distinct elements are found in one word. In this manner nouns, adjectives, and pronouns are undifferentiated. But it is the verb in which this characteristic is more distinctly exhibited. In such languages the verbs contain a variety of adverbial elements—first, of condition and time, giving rise to mood and tense, and second, of manner and place; each one a distinct adverbial element. Again, in such words the subject pronoun with its adjective qualifiers appears. So that in these lower languages a single word, usually called the verb, is a combination of many parts of speech. In such language, sentences are imperfectly developed, and this from the fact that the elements of a sentence, namely, parts of speech, are not clearly differentiated as distinct words.

There are many ways in which this synthesis or holophrasm of the lower languages is brought about. For example, the savage

falls into curious habits in counting, by expressing in words the complete act of counting. Suppose he is counting skins of animals, and in doing so places one on another until his collection is counted, While in the act of counting he says, "I put 1 on; I put 2 on; I put 3 on; I put 4 on; I put 5 on;" *pari passu* with the several acts. These little sentences expressive of the act, modified and cut short in various ways, come to be the names of the numbers applied to such objects as are counted in this manner. At another time perhaps he is counting arrows, and then his expressions will be, "I lay 1 down; I lay 2 beside; I lay 3 beside; I lay 4 beside; I lay 5 beside; I lay 6 beside;" &c. By constant exercise in this method of counting, the expressions for the act of counting come to be worn and used simply as the names of numbers for counting arrows and similar objects. In a like manner different series of names for the same numbers are developed and used in the counting of a particular class of objects, and they are therefore called by grammarians *Numeral Classifiers*. There is a great variety of ways by which holophrastic words are formed through combination; and the languages in which this characteristic appears in the most prominent manner are often called synthetic, holophrastic, &c.

In the progress of languages holophrastic words are worn out and eliminated, and in lieu thereof parts of speech are differentiated. Languages differ from one another in this respect only in degree; all are more or less holophrastic. To the extent that names express number and gender they are holophrastic. To the extent that pronouns express person, number, gender, and case, they are holophrastic. And to the extent that verbs express person, number, gender, condition or mode, time or tense, &c., they are holophrastic. In fact, the verbs, even of the highest languages, are not simple parts of speech. Should there come to be a language in which the parts of speech are wholly differentiated, there could be but one verb—the predicant. The verb *to be* in the English language is nearly such. By the differentiation of the parts of speech the sentence is integrated, and thus language is organized. Now progress in language is characterized by the specialization of the grammatic devices and the organization of the sentence.

The same device may be used to perform various functions, and various devices may be used to perform the same function. Complete specialization requires that there shall be but one function for a device and but one device for a function. To illustrate this in the

simplest manner, consider the methods by which the important word in a sentence is designated. In English this is mainly done by emphasis. In other languages the important word is put first or last; it is therefore designated by arrangement. In still other languages an important word is intensified by adding to it some other word or particle by which its meaning seems to be strengthened; this is by combination, a method frequently observed in Greek and Latin. Thus three devices may be used to perform the same function.

Again, combination may be used to strengthen words, as shown above. Combination may be used to qualify the meaning of a word—that is, a particle may be added to a word to change its meaning more or less. Something may be added to a word to express its relations to other words in the sentence—*i. e.*, the device may be used for syntactic purposes. Now, *ceteris paribus*, the grade of any language may be determined by its specialization of these devices. Again, the grade of a language may be determined, *ceteris paribus*, by the degree to which its parts of speech are differentiated, so that the simple logical sentence may be constructed therewith. Again, the grade of a language depends upon its sematologic content—*i. e.*, the ideas and thoughts which it is competent to express. Judged by these criteria, languages steadily progress from the lowest savagery to the highest civilization.

The brief statement which has been made is all that seems necessary for the present purpose, the object being simply to call attension to the fact that the course of evolution in language is determined. In the struggle for expression, language is invented, and it can be shown that the specialization of grammatic devices and the organization of the sentence are brought about by the survival of the economic in the endeavor to express thought. Language springs from innumerable centers, and, in general, progress has been toward unification. As the centuries of human endeavor have passed, languages have become fewer in number and more persons have spoken the same language. True, specialization has sometimes resulted in degradation, by the multiplication of different languages of the same stock; so that with much progress there has been some retrogression; but everywhere man has been endeavoring to communicate his ideas to his fellow-men, and the few languages that exist upon the earth to-day are the product of all the effort of all the people who have heretofore existed upon the planet. A language is as much an invention as is an art or an institution, but it should

be remembered that a language, as it exists at any one time, is the invention of all the people who have spoken it—an invention by minute increments, in the same manner as an art or an institution. Of the many languages that have been invented, of the many uses of the grammatic devices, and of the many words that have been coined, but few remain, and these are left because they have been chosen. The objective activity has progressed through endeavor and the exercise of choice upon the part of the actor—man.

EVOLUTION OF PHILOSOPHY.

Opinions are the units of which philosophies are composed. A philosophy is a system of opinions entertained by individual men or peoples relating more or less fully to all of the phenomena of the universe with which such men or peoples are vaguely or more thoroughly acquainted.

Primitive man knew more of himself than of other living beings, but this knowledge was vague and imperfect. In his attempt to account for the original activities or properties of the external world not man, his first explanations were based upon analogies with phenomena of his own existence subjectively interpreted. But as man was the most complex being in the known universe of nature, by this method the simple was explained in terms of the complex. Civilized man has discovered that explanation must first be based upon analysis, and that the explanation of the more complex must be a synthesis of the less, in terms of the less.

Early man discovered in himself design and will; discovered that he had the power to plan, to form a purpose, and to execute that purpose. Each individual discovered this in his own actions and in the actions of those with whom he was most intimately associated. So he projected design and will into all of the external universe of his knowledge. He interpreted all motions and changes as teleologic activities. Such a philosophy is called Mythology. This philosophic method passed through many stages, but at every step phenomena that had been mythologically explained came to be correctly explained; that is, along the course of mythologic history there was progress in knowledge, so that philosophies were compounded of mythologic and scientific explanations. As more and more was known, less and less mythologic explanation appeared, until at last, in the early history of civilization, as distinguished from preceding barbarism and savagery, the verity of all mythology was questioned.

As yet, but a small part of the known universe was scientifically explained, and although mythology to a greater or less extent fell into disrepute, there was insufficient real knowlledge to supply its place. By this time man had learned much of language, and it seemed to him a wonderful, almost miraculous, instrument. As all thought is expressed in language, he began to suppose that the basis of thought is language; that the word is not a counter, but a coin. So he began to explain the phenomena of the universe simply as the phenomena of language, and the *names* were the *things*. This was the origin of metaphysic philosophy.

Along with the growth of this philosophy there was an evolution of knowledge—scientific philosophy—until in modern times it has well-nigh displaced both. Knowledge, or science, is the discernment and classification of phenomena as they appear in coexistence and sequence; and when phenomena are thus discerned and classified they are said to be *known*. Such is the nature of scientific opinion. But how do such opinions arise? How is knowledge increased? Manifestly by increasing discernment and classification. Men do not go about the earth indiscriminately discerning and grouping. Psychology teaches us that man subjectively perceives only that which he compares; that is, that discernment and classification go hand in hand and are parts of the same process. He cannot discern without classification, and he cannot classify without discernment. He cannot perceive without comparing, and cannot compare without perceiving. Perception and reflection go hand in hand.

The objective impression may occur without the subjective act of discernment. In order that there be the subjective act, there must also be comparison, and this is dependent upon the constitution of the mind itself.

Such, then, is the nature of knowledge. Every step in the advancement of knowledge is primarily made by the use of a hypothetic explanation. The mind having imagined an explanation of phenomena, tests the value of the hypothesis by more careful discernment and comparison. If the hypothetic explanation be not true, the discernment and comparison have yet led to an increase of knowledge. But there is no increase of knowledge without a precedent hypothesis. All human research, in every particular, is dependent upon antecedent hypothesis; for without some hypothesis there can be neither discernment nor comparison, as objective im-

pressions are not woven into mental structure. Verified hypotheses are scientific opinions, and as they are systematized scientific philosophy is constructed.

An example of the three methods of explaining the same phenomenon will more clearly set forth their characteristics. The Algonkin Indian personifies the north-wind. In his mythology is found the story of the contest between *Ka-bi-bo-no-ki*, the god of the north-wind, and *Shiñgapis*, the ancient of mud-hens. The conflict was a drawn battle, and *Siiñgapis* was not driven from the country. But through the terrible agencies used by the north-wind to destroy *Shiñgapis* all the other birds were driven away. The tradition of this conflict still lives among the birds, and when the north-winds blow in the autumn they leave the country. This is the Algonkin philosophy of the migration of birds.

In metaphysic philosophy birds are said to have an *instinct* of migration, whatever that may be. By giving a name to the phenomenon it is held to be explained. Instinct is a primordial endowment, and the explanation is therefore absolute. If the word connotates any further explanation, as that the instinct was implanted for a purpose, it is mythologic.

Science comes in and explains an instinct as a habit—the growth of a specialized activity; and the growth of such an activity is explained in this manner: Birds, finding their particular habitat no longer congenial by reason of inclement weather and the scarcity of food, one or both conjoined, seek regions of more genial climate and more abundant food. Those more successful, in the long run survive and multiply; those less successful diminish in number and ultimately perish. In this manner a particular habit or activity is developed from generation to generation with any given species, so that it migrates from time to time in search of better climate and more food; and the activity of any given generation of birds is born of the experiences and activities of preceding generations. If such a theory indeed be true, it is a veritable explanation, and belongs to scientific philosophy.

These three systems live side by side even among the same people. In the early history of metaphysics it borrowed largely from mythology; in its latest history it incorporates a large body of science. It is essentially a transition stage of philosophy, bridging the chasm between analogic imagining and homologic reasoning.

Scientific philosophy may, in a broad way, without definite de-

marcation, be set off into three stages. In the first, mechanical phenomena were discerned and classified; molar bodies and their relations were explained by scientific methods. This is the mechanical stage of philosophy. Then discernment and classification extended beyond the direct perception of the senses, by the invention of the telescope, and stellar bodies were discerned and classified. Then by the use of the crucible and the microscope the minute constitution of substances was discovered, and this has led men into the vast domain of chemistry and allied sciences. Thus, in the second stage knowledge is extended outward toward the infinite and inward toward the infinitesimal. This is the stellar and molecular stage of science, when bodies were classified as co-existences and as yet the phenomena of sequence were but imperfectly understood. The most important sequences were first discovered in the astronomic world. Then sequences were discovered in the molecular world of the mineral kingdom. Then finally a great body of sequences were discovered in the biotic world. Early in the history of mankind a few activital sequences were discovered, but at last a great realm of activital sequences are known, and the establishment of the science of evolution marks the third great stage. The second has its beginning far back in the first, and the third has its beginning far back in the second; and yet the three stages are philosophic verities. So also with the general stages of philosophy. Metaphysic philosophy had its beginning far back in mythology, and scientific philosophy had its beginning far back in metaphysics.

The course of evolution as thus set forth may be more succinctly defined in terms of psychology. Philosophy progresses by the progressive discernment of the phenomena of co-existence and sequence, and their relegation from analogic tc homologic categories.

From this brief and too abstract statement of the nature and evolution of philosophy we recognize the fact that opinions, as units, and systematized opinions, as the philosophies which they constitute, result from the mental activity of many men through many generations; and the body of scientific philosophy as it exists to-day is the product of all the mental effort of all the human beings who have existed. It is a vast structure, erected by minute increments. Philosophy is the result of man's struggle to know and his invention of hypothetic explanations, and his choice therefrom of such as discernment and comparison prove true.

EVOLUTION OF MIND.

The evolution of the four great classes of objective activities has thus been set forth. There yet remain for consideration the subjective activities embraced in psychology.

No attempt will here be made to explain the structure of the mind and the course of its evolution. Psychology is a science of great magnitude, embracing on the one hand a consideration of the biotic structure and functions of the nervous system, and on the other the transmutations of objective impressions into subjective sensations, and their transmutation into perceptions and feelings, and then the transmutation of feelings into emotions and emotions into will, and of perceptions into judgments and judgments into opinions, and opinions into designs. Such is the subject-matter of psychology.

Objective activities arise from designs. The vast course of evolution through which the human mind has passed in its highest estate has been due to the reaction of activities upon the mind itself, *i. e.*, the mind has grown through exercise in objective activities. Man is impelled to this exercise by his desire for happiness, and thus he invents arts, institutions, languages, and philosophies. The initial steps in this process are original inventions, and these are taken by the leading minds. Then others follow in these steps by imitation, selecting such inventions as will increase happiness. By this process they re-invent for themselves and, to a large extent exercise the mind in the same psychic activities. This is acculturation. It is the subjective adjustment of the lower to the higher. Finally, activities are objectively diffused by instruction. Parents teach their children. Schools are not confined to civilized man. In every tribe and nation known to man an organized system of instruction is discovered. In an Indian tribe the matron and patriarch of the clan are instructors of the youth, and regularly teach in all the four departments of activities. At stated times the chiefs and councilors of an Indian tribe instruct the young men in the nature of their institutions. At frequently recurring festivals the first hours or first days are devoted to instruction, and the dancing and the feasting occur when the people pass from labor to refreshment. At other times and seasons the medicine men or priests of a tribe systematically instruct their people in philosophy. Thus it is that no tribe has yet been discovered that

has not its organized system of instruction. Psychologic evolution, therefore, the evolution of the individual man, arises through the three agencies—invention, acculturation, and instruction.

Man, prior to the evolution of objective activities, progressed under the methods of biotic evolution, namely, the survival of the fittest in the struggle for existence. But man as an animal is no longer to any appreciable extent dependent upon the biotic method. The exercise of his animal functions is now controlled, to a greater or less extent, by mind in the prosecution of activities; and among the lower and higher races of men the youth are systematically trained in physical exercise. Athletic games and sports designed for physical exercise are born in the lowest savagery and are continued to the highest civilization.

There are three methods of evolution: Evolution in the mineral kingdom is by direct adaptation to environment. Evolution in the biotic kingdom is by indirect adaptation to environment through the survival of the fittest in the struggle for existence. Evolution in the anthropic kingdom is divided into two parts—the evolution of activities, and the evolution of the unit man. In the first, evolution of arts is by invention and the selection of the labor-saving. Evolution of institutions is by invention and the selection of the just. Evolution of language is by invention and the selection of the thought-saving. Evolution of opinions is by invention and the selection of the true. Evolution of the unit man is by invention, acculturation, and instruction, and the environment is adapted to man.

Early in the history of philosophy man in part discovered the laws of human evolution, viz., that part more immediately within his knowledge. But there was always some remote part not thus understood. When, during late years, the processes and methods of biotic evolution were clearly set forth by a host of bioloigsts, and the theories successfully applied to all biologic sciences, it was discovered as inevitable that the same laws must apply to man as an animal. But their application was carried beyond the limits of truth. Man, as a being superior to the lower animals, was supposed to have made progress by the same laws—by the survival of the fittest. No error in philosophy could be more disastrous. And yet this statement is widely accepted. These false doctrines are taught at the highest seats of learning, and are spread broadcast among the people through the press. "The Survival of

the Fittest" is inscribed on the banner of every man who opposes any endeavor to ameliorate the condition of mankind. Only this week have I read in *The Lancet* an apology for physicians because they seek to save life and relieve pain, even among the poor and the despised.

The great biologists themselves have not thus misapplied the principles discovered by them. One of Huxley's most interesting papers sets forth the interdependence of men, and compares anthropic organization to biotic organization, and explains as injury to one class of men is injury to all, in the same manner that injury to one organ of the body is injury to the entire structure. Yet there are many men who from the verge of science are exploiting in sciology, as if man were a beast.

There are many strange transfigurations. It is a wonder that the blows of the hammer are transmuted into heat. It is a wonder that the motions of the ether can be transmuted into the rainbow. It is a wonder that the egg can be transmuted into the eagle. It is a wonder that the babe can be transmuted into the sage. It is a wonder that an objective blow may be transmuted into subjective pain. It is a wonder that the vibrations of the air may be transmuted into melody. It is a wonder that the printed page may be transmuted into visions of the beautiful. But the wonder of wonders is the transfiguration of selfishness into love. Amatory passion transfigured appears as love, parental care as parental love, infantile dependence as filial love, fraternal sympathy as fraternal love. Thus love of kindred was born; and the love of kindred, by the expansion of the kinship body into the tribe and nation, grew to love of country and love of mankind. The last transfiguration in the process of evolution appears as the ethics of mankind.

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